

# The IRON AGE

ESTABLISHED 1865

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## Two-Way Improvement

WE are apt to lose perception of improvement in things with which we are daily closely associated. But the way to appreciate change in people, products or methods is to return to them after an absence of ten or twenty years.

I have just had an experience of this kind, having been carted away a week ago to the hospital where this is being written. The reason: Double pneumonia and pleurisy.

Just about twenty years ago, to the day, I had a similar experience except that it was merely a one-lunger, without the pleurisy. Also I was twenty years younger than now.

In those days, however, before sulfa and penicillin were known, the betting was 50-50 as to whether you would be taken home in an ambulance or an undertaker's wagon.

I remember very distinctly my earliest experience with the pneumococcus bug and there has certainly been an improvement in the methods of handling him since then. At this stage of the game, then, I was seeing pink elephants instead of writing editorials. But maybe from the reader's standpoint that is retrogression rather than progress.

However, to remove the personal coefficient, I must tell you about the lady patient next door who paid me a friendly visit. As hospitals are very friendly and democratic institutions, she came in without an introduction and indeed without knocking at the door. She was very interesting and told me that she was 85 years old, had had pneumonia and was going home next day. I asked her how she caught pneumonia and she said she got it from shoveling snow.

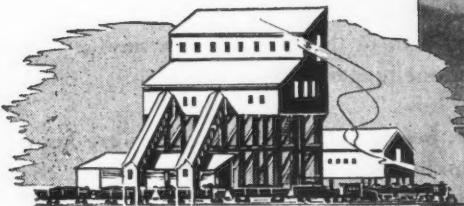
Imagine anyone 85 years old getting away with pneumonia 20 years ago!

I have heard about many other remarkable medical and surgical improvements, too, since I have been here. Evidently, there have been great advances in the techniques of saving and lengthening life during the past two decades. It seems not to have been confined to any one nation but has taken place even in the Axis countries.

By the same token, during this same twenty-year period there has been an equally widespread improvement in the techniques of taking life and of shortening it through war. Any one knows who reads The Iron Age.

Having had time to think about most anything that came to hand during the past week, I thought how nice it would be if we could confine all our improvements to doing good to people. Then I started thinking how that could be brought about. I am afraid you will have to give me a few more days on that one.





*This 23 yard Inland Hi-Steel bucket, at the right, saved \$23,000 the first year.*



## **INLAND HI-STEEL SAVES \$23,000**

**Facts and figures prove advantages of using Inland Hi-Steel where light weight and high strength are needed.**

The records maintained at Maumee Collieries show that when Inland Hi-Steel replaced castings these important advantages were gained:

- (1) The first cost was 40% lower.
- (2) Maintenance was cut in half.
- (3) Weights were decreased as much as 32%.
- (4) Capacities went up an average of 51.6%.

The cost logic behind the use of Inland Hi-Steel was summed up by a Maumee official when he said, "We estimate that our 23 yard Inland Hi-Steel bucket saves three tenths of a cent a yard over the bucket previously used. In one year this 23 yard bucket moved 7,671,000 cubic yards of overburden at a total saving of \$23,000." Scores of products and processes for war

and peace are utilizing the corrosion-resistant, abrasion-resistant, high-strength and light weight characteristics of Inland Hi-Steel. Write us if you would like further information.

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**INLAND**  
**Hi-Steel**

## News Front

Hitler has instituted a new military decoration to rank as the highest German medal for bravery. It is the golden oakleaves with swords and diamonds to the Knights Insignia of the Iron Cross. It is limited to a maximum of 12 awards.

Whereas American steel makers are disdainful of steel recuperators as a means of heating blast furnace blast on a continuous cycle, German producers report their use as resulting in considerable saving in power consumption and smaller heat losses.

Further efficiencies are expected by combining the steel recuperator with the therodynamic turbine as the prime mover for blast-furnace blowers.

Captured Republic P-47 Thunderbolts, with German markings, have been used extensively for the strafing of American troops.

The twin-turbine Messerschmitt Me 262 Schwalbe (Swallow), the German's most common "squirt" aircraft, is being encountered in very large formations, but seldom do they pick a fight.

Probably large numbers of Luftwaffe pilots are training in these new aircraft in the hope that Germany can regain mastery of the air when better weather comes.

The other German "squirt" job, the Messerschmitt Me 163B Komet, a true rocket aircraft, burns liquid oxygen, hydrogen peroxide and calcium permanganate, and has been observed at speeds in excess of 600 miles per hr. They climb at speeds of 0,000 ft. per min. Men of unusual physical stamina are required to fly these craft.

As greater number of Kometes appear their danger to bomber formations is becoming serious.

Great Britain must increase its exports to five times the present figure in order to redeem debts incurred during the war, according to H. R. Brand, Washington representative of the Chancellor of the Exchequer and the British Treasury.

In the United States alone, England has spent over \$7 billions while in Canada all dollar earnings there have been spent and additional Canadian dollars were gained by selling back to Canada sterling investments amounting to 700,000,000 Canadian dollars.

WPB Requirements Committee last week agreed to restrict second-quarter allotments to 104 per cent of estimated supply and agreed that there would not be any new supplemental military allotments before the half year ends in order to stave off the threatened disruption of CMP operations.

The danger of CMP breaking down and letting the steel situation rocket into the same "inflation" as it did when PRP and the priorities system fell apart, was brought on by the allotment of 114.6 per cent of estimated supply in the first quarter and the granting of WPB of tickets for an additional 870,000 tons of steel in the first two weeks in January.

Postwar plans in magnesium and aluminum are being aired before the Senate Small Business Committee this week. It is reported that Reynolds Metal intends to increase its postwar ingot capacity by making offers for DPC plants now operated by the Aluminum Co.

A pilot precision casting plant where cutting tools are cast from high speed steel scrap sponsored by the Ford Motor Co. at Camp Legion, Dearborn, Mich., has been established as part of the vocational training program for disabled veterans.

To accommodate students, who in many cases could use only one arm, design changes were made in the molds and wax injection machines. Since the handling of large metal molds occasioned strain, experiments on the use of a lighter material resulted in the utilization of a general purpose thermosetting plastic as the old material. A refinement to the multiple mold consists of replaceable inserts in the holding or matrix portion of the mold.

More than 1,000,000 tank track shoes a month will be needed by Ordnance in '45. The shoe has become one of the most critical war items, 530 of them needed for every medium tank while tank production is scheduled for an overall increase of 67 per cent.

# Material

## and

# Process Selection

... Metal selection for a given end-product is not always simple or apparent. Production methods often are of more importance than physical properties of the metal or its price. One excellent example of this, herein, is the substitution of steel for magnesium in the B-29 nose frame. This is a paper presented originally before the SAE in Detroit.

MOST product thinking is conditioned by manufacturing environments. Such conditioning affects the selection of materials and processes much in the same manner as environment influences personal habits. Fabricators of heavy steel, welders, stampers and press-formers, forgers and coiners of metal think and compare product designs in terms of their own experiences. Each, however, has the same objective—to determine the most suitable construction for the product or piece. Each specialist could provide a different answer.

Often the manufacturing specialist can greatly assist those designers who conceive end-products. Too often this helpful relationship may be unencouraged. The progressive man-

facturing converter can often be more helpful in defining the material or process than the material manufacturer. This applies with lightweight materials and heavier materials alike. Often the material manufacturer's representative lacks familiarity with latest conversion processes, converting facilities, design ingenuity; or his partiality determines the material selection. There is a market where each material and process rightfully belongs, so more need for avoiding the pitfalls of misapplication that penalize development. True, material selection is not always simple or apparent; much progress is always made by trial and error.

It may be of interest and help to relate some practical experiences as a few comparative "case histories" to

help define some "supremacy areas"\*\* for low alloy steel and steel processes developed for aircraft.

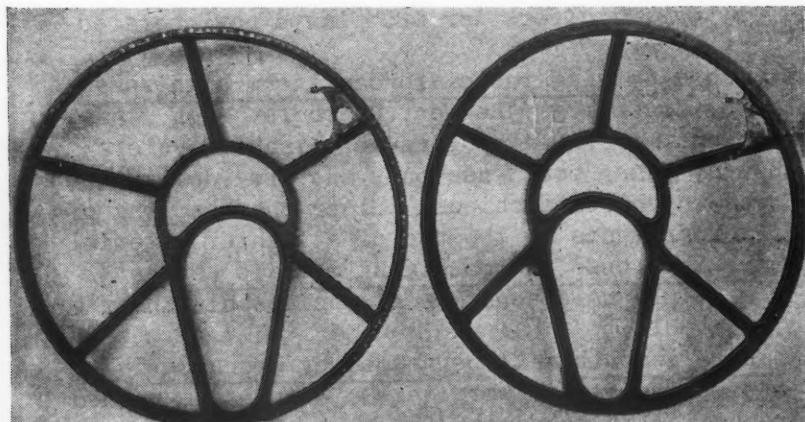
\* See "Research the Lodestar of Industrial Postwar Success," J. H. Van Deventer. Printers' Ink, Sept. 15, 1944.

Recently an unusually interesting case developed which substantiated the above contentions regarding the selection of materials and processes, and where steel was used successfully for the replacement of magnesium in the B-29 bomber nose frame (see Fig. 1), with weight a really important factor. Interesting, particularly because such experience means debating with selection of the lightest of material for application in its foremost market, aviation; and because substitution involves both materials and processes. Quite logically the airplane designer conceived the original frame member to be constructed of the lightest possible material, magnesium, and adopted the process of casting because of the great irregularity and shape and cross-section.

Producing the frame casting by a most resourceful foundry organization proved a major accomplishment. It is reported some 3000 to 5000 lb. of sand were required for molding each casting having a finished weight of only 38 lb. The cost was further penalized by the necessity for extensive use of chills, together with large gates and risers, weighing many times the casting finished weight, in an effort to control solidification and provide a homogenous cast material. Rejections of castings after X-ray examination aroused such anxiety over delivery that the Mid-central District of the Air Technical Service Command began search for some alternative solution.

With characteristic thoroughness every consideration and factor involved in the frame structure was

FIG. 1—Inside views of B-29 bomber nose frames. Left, welded steel frame; right, cast magnesium frame.



questioned by the Air Technical Service Command. Why need the frame be cast, and why need the material be magnesium, if all that was desired was an equally strong lightweight structure? Why not use steel? Steel, such as used for other more severely stressed landing gear structures? The Air Corps technicians, together with several members of the A. O. Smith Corp., compared the ratios of strength and weight, and modulus of elasticity for steel and magnesium, with such encouraging reactions that the necessity for a design study was quite apparent.

The completed study of the design confirmed the original indications, that the use of steel was in many ways preferable for this light-weight service, even in comparison with the lightest of materials, magnesium. Weight calculations revealed that the steel structure could be slightly lighter in weight than the magnesium structure and satisfy all the functional requirements (see Table I). A finished structure of identical shape, though different in cross-section (see Fig. 2), could be constructed so that the specially formed and cut ellipsoidal glass and plastic transparencies could be utilized together with the same method of cover plate fastening. Weight, however, was but one of the important factors; there was strength and stiffness still to be considered.

With this structure designed to resist the internal pressure of the pressurized cabin, it was vital that the structure remain pressure tight under all service conditions, such as impact in landing or when pierced by enemy action, and with changes in temperature and internal pressure. The irregular nature of the ellipsoidal shape so complicated the problem of strength and stiffness determination that simple comparative analysis was the most practical next approach. The frame structure was accordingly divided into the principle cross-sectional members or ribs and each separately compared for strength and stiffness (see Fig. 3 and Table II). Formed pressed shapes of a high-strength low-alloy S.A.E. 4340 material with a yield strength of 135,000 lb. per sq. in., or nearly eight times the 17,000 lb. per sq. in. yield strength for the cast magnesium material, was selected to compensate for the four times greater unit weight of the steel material. With this selection of

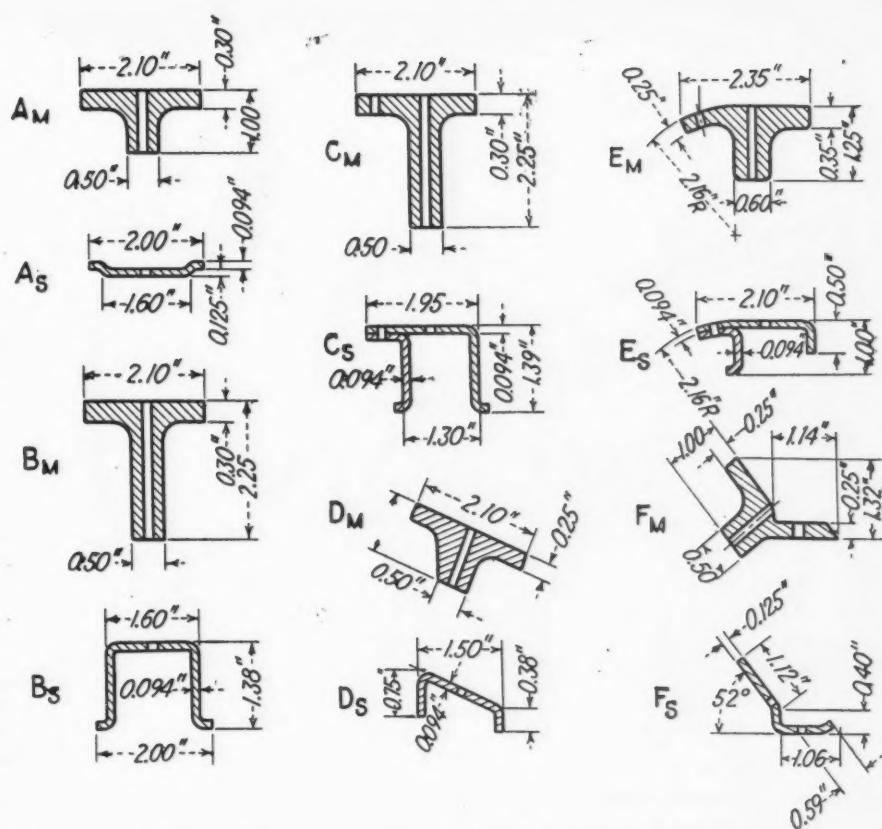


Fig. 2—Cross-section comparison of welded steel and cast magnesium B-29 bomber nose frames.

steel, the calculated strength index of the greatest stressed upper struts or rib members proved more than double that of the cast magnesium, which was satisfactory or even an improvement. But the calculated stiffness ratio of these same steel ribs proved only half that of the cast magnesium ribs, and so evaluation of the stiffness factor became most important.

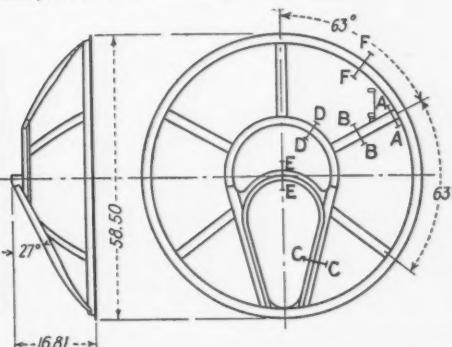
#### Rib-By-Rib Analysis

This comparative method of sepa-

rate rib analysis served primarily to compare weight and to indicate the possibilities for an alternative construction that justified building an actual steel nose frame of the design suggested. This became the only suitable procedure to answer the indeterminate questions and evaluating the composite stiffness of the redesigned frame. So approval was obtained for an experimental frame construction embodying our specialty background experience of press-forming and then

TABLE I—Weight comparisons of alloy steel and cast magnesium frame.

Item	Description	Weight, Lb.
1	Rim	14.95
2	Upper Ribs	6.58
3	Side Ribs	4.30
4	Outer Ring	2.51
5	Inner Ring	1.44
6	Lower Ribs	4.41
7	Channel	2.72
8	Gusset Plate	0.16
9	Bracket	2.00
Total Weight		39.05



Total Weight of Welded Press-Formed Steel Frame.....  
 Shorter Bolt Weight Saving Fabricated Steel Frame.....  
 Combined Weight Steel Frame Less Bolt Saving.....  
 Weight of Cast Magnesium Frame.....

39.05  
 2.00  
 37.05  
 39.50

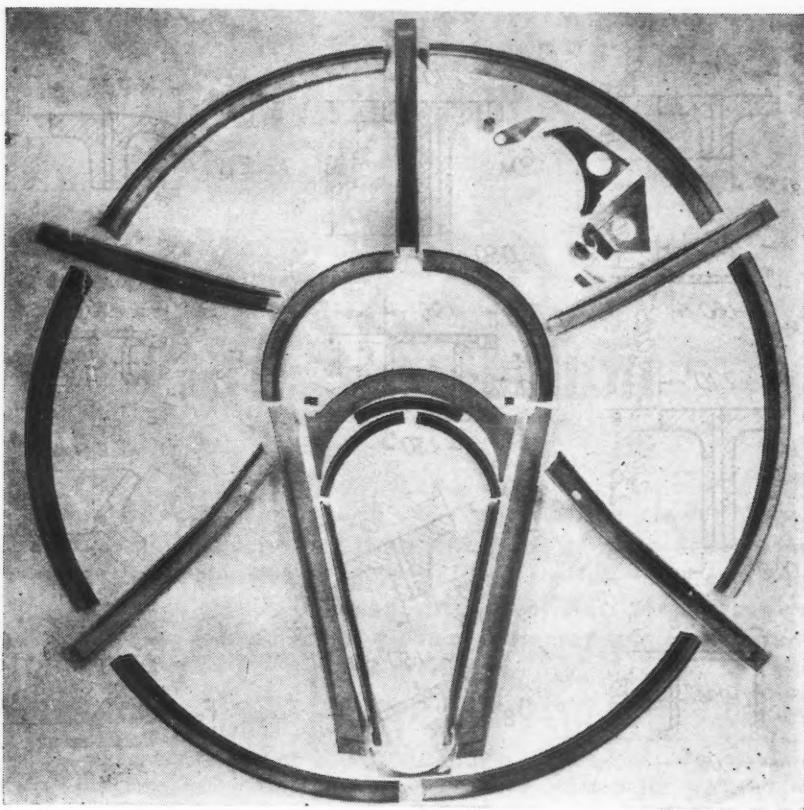


Fig. 3—Separate press-formed pieces for steel B-29 bomber nose frame.

assembling separate pieces by welding to provide a new simple construction. Stamping and drawing the whole frame structure from a single steel sheet was not considered because doing so would seem no more practical to us than making an automobile frame by such method; nor did we consider forging and machining the

pieces, as might have been first suggested by individuals with only that type of experience.

Experimental testing of the steel frame, complete with assembled transparencies proved most revealing. It was found practical to produce an actual assembled steel frame of comparable weight as estimated. At the

specified pressure no leakage occurred; and by progressive pressure increases a greater pressure was sustainable without leakage than had been possible with the cast magnesium frame. Even after leakage there was no sign of structural weakening, which further indicated that even greater safe pressures were possible with but minor increases in weight to provide the stiffness to prevent leakage. This latter factor, together with the greater resistance to frame cracking or rupture and the fact that the structure could be readily field-repaired in an emergency were additional advantages favorable for steel. Production and quality control were simplified with steel construction, reclaiming of rejected frames was a simple matter and so the redesign proved a most practical solution for an important structure.

Cost considerations in this particular instance were not such important factors. But since cost so often is a major criterion, some comment on this may be of interest. The cost of the finished assembled nose piece in steel construction is comparable to the latest reduced costs of the finished assembled cast magnesium construction. With comparable conditions the steel construction should prove more economical, especially since the machine finishing operations are materially reduced with accurate forming and assembling of the mullion ribs (see Figs. 4 and 5). The problem of glazing was likewise reduced because the transparencies could be made and formed to fit the gages for the openings. The rough weight of the alloy steel material was less than one-quarter that of the rough cast magnesium material, largely because no casting gates and risers were required, and which reflected in cost savings and savings in critical material. Little new equipment was required for the steel construction, since the principal operation is simple press-forming and for which there was adequate equipment available, while the dies and fixtures were not costly. Thus capital expenditures also proved materially less for steel than for the cast magnesium construction and so cost factors as well were favorable for steel.

To summarize, the findings for the B-29 bomber nose frame redesign and the considerations of welded press-formed alloy steel compared with cast magnesium construction are:

- (1) Weight is equal for welded press-formed alloy steel.
- (2) Steel construction is stronger.

TABLE II  
Strength, Stiffness and Weight Calculations  
B-29 Steel and Magnesium Nose Frame Sections

Section **	Cross- Section Area, Sq. In.	Moment of Inertia I	Section Modulus S	Stiffness Factor E I	Yield Strength Index, Per Cent	Ultimate Strength Index, Per Cent	Stiffness Ratio, Per Cent	Weight Ratio, Per Cent
A <sub>m</sub>	0.103				100	100		
A <sub>s</sub>	0.190				146	92		
B <sub>m</sub>	1.660	0.584	0.390	5,440,000	100	100	100	100
B <sub>s</sub>	0.406	0.086	0.106	2,640,000	216	138	49	102
C <sub>m</sub>	1.660	0.584	0.390	5,440,000	100	100	100	100
C <sub>s</sub>	0.499	0.097	0.111	3,080,000	255	142	57	126
D <sub>m</sub>	1.000	0.291	0.268	1,700,000	100	100	100	100
D <sub>s</sub>	0.229	0.071	0.095	2,050,000	282	177	120	96
E <sub>m</sub>	1.400	0.123	0.153	975,000	100	100	100	100
E <sub>s</sub>	0.408	0.026	0.035	800,000	181	114	82	123
F <sub>m</sub>	1.000	1.000	1.000	6,500,000*	100	100	100	100
F <sub>s</sub>	0.299	0.125	0.250	3,600,000*	197	125	56	126

KEY: "A<sub>m</sub>" is rib section for Magnesium; "A<sub>s</sub>", same for steel; etc.

Magnesium: Spec. AN-QQ-M-56A; Y.S. 17,000 lb. per sq. in.; U.S. 30,000 lb. per sq. in.; E 6,500,000.

Alloy Steel: Spec. S.A.E. 4340; Y.S. 135,000 lb. per sq. in.; U.S. 150,000 lb. per sq. in.; E 29,000,000.

\* See nose frame "Cross-Section" and key diagram for shape and location of rib sections.

\* Per unit length.

- (3) Is stiff enough for the functional service.
- (4) Steel construction is less easily damaged.
- (5) Is field repairable and shop reclaimable.
- (6) Also steel construction is simpler, cheaper and quicker to produce.

### Landing Gear Members

Another group of equally interesting cases is that comparing the use of different fabricating processes, but with the same material, such as welded press-formed steel and forged bolted steel constructions. These cases are not as spectacular or as controversial as the case just reviewed, or cases between different materials using either the same or different manufacturing processes.

The aircraft industry has greatly stimulated constructive redesign development by presenting opportunities where weight savings and greater strength or safety are of great importance. A. L. Klein, a Douglas Aircraft design consultant, evaluates weight savings at the value of gold, or \$35 per oz.; and mentions \$10 per lb. as currently and commercially allowable.\* With the range of evalua-

TABLE III Weight and Strength Comparisons of Several Plane Landing Gear Structures			
DESCRIPTION	Original Design, Lb.	A. O. Smith Design, Lb.	Differential, Per Cent
<b>C-47 LANDING GEAR TRUSS (one required)</b>			
Rough material weights.....	186	80.8	-56
Finished structure weights.....	60	40	-34
Strength comparison.....	100%	125%	+25
Combined strength, wt. eff.....	100%	189%	+89
<b>B-24 MAIN LANDING GEAR FORK (two required)</b>			
Rough material weights.....	436	355	-18
Finished structure weights.....	202	202 to 213	0 to 5.4
Strength comparison.....	108,800	128,000	+18
Combined strength, wt. eff.....	100%	112 to 118%	12 to +18
<b>B-29 MAIN LANDING GEAR TRUNNION (two required)</b>			
Rough material weights.....	710	256	-64
Finished structure weights.....	229	157	-33

tion so liberal most any amount selected warrants reasonable redesign efforts.

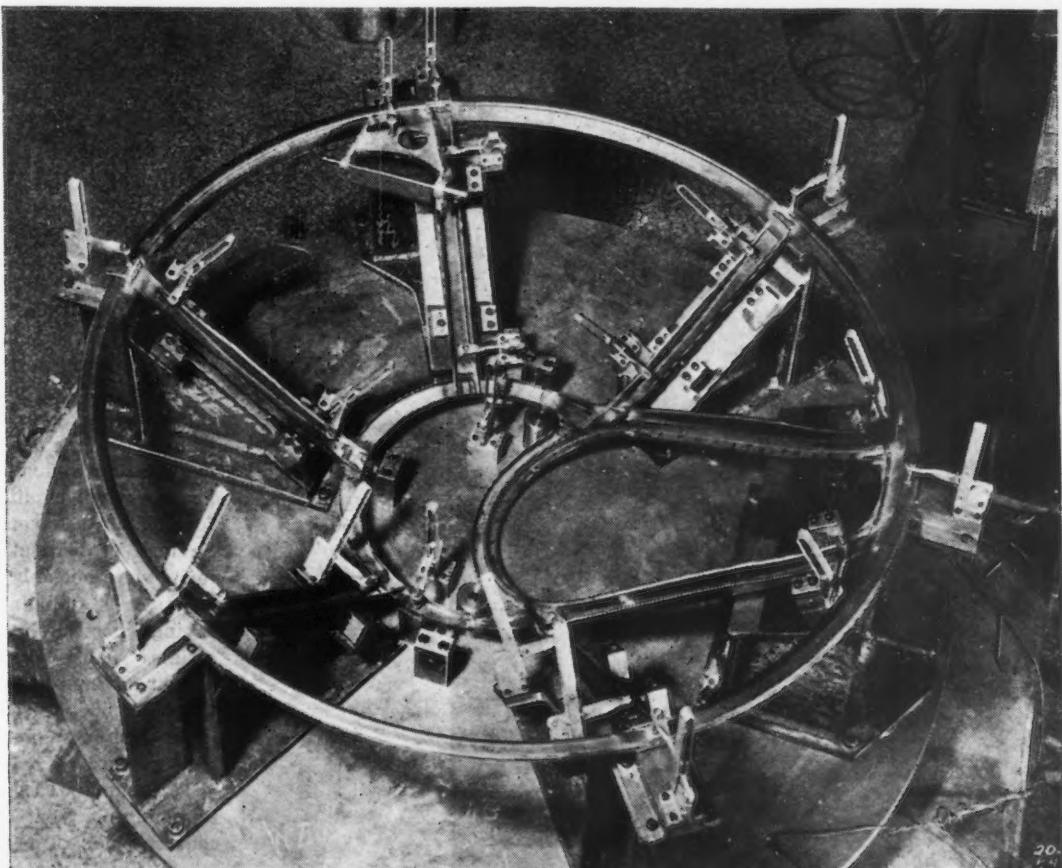
\* "Fundamental of Airplane Design," A. L. Klein, S.A.E. Transactions, Vol. 52, No. 12.

The several selected plane landing gear redesign cases proved that welded press-formed alloy steel construction offered many advantages over forged and bolted alloy steel construction. According to Jerome S. Hunsaker, National Advisory Committee for Aeronautics, the size of

planes will be strictly limited by the economies of larger landing gear, engines, including propellers, and landing gear, and the latter especially serious for land planes. Therefore, these landing gear cases may be more important in revealing a design development trend for such critically stressed members.

By redesigning the truss of the C-47 landing gear of the Douglas cargo plane for welded press-formed alloy steel, considerable weight was saved and a difficult production problem circumvented (see Fig. 6). Two

FIG. 4 — Welding assembly fixture for steel B-29 bomber nose frame members.



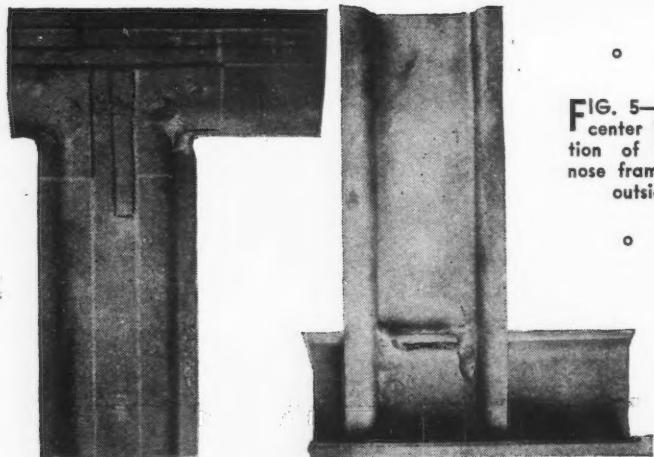


FIG. 5—Welded steel center joint construction of B-29 bomber nose frame, inside and outside views.

FIG. 6—Welded press-formed steel truss construction of C-47 cargo plane landing gear.

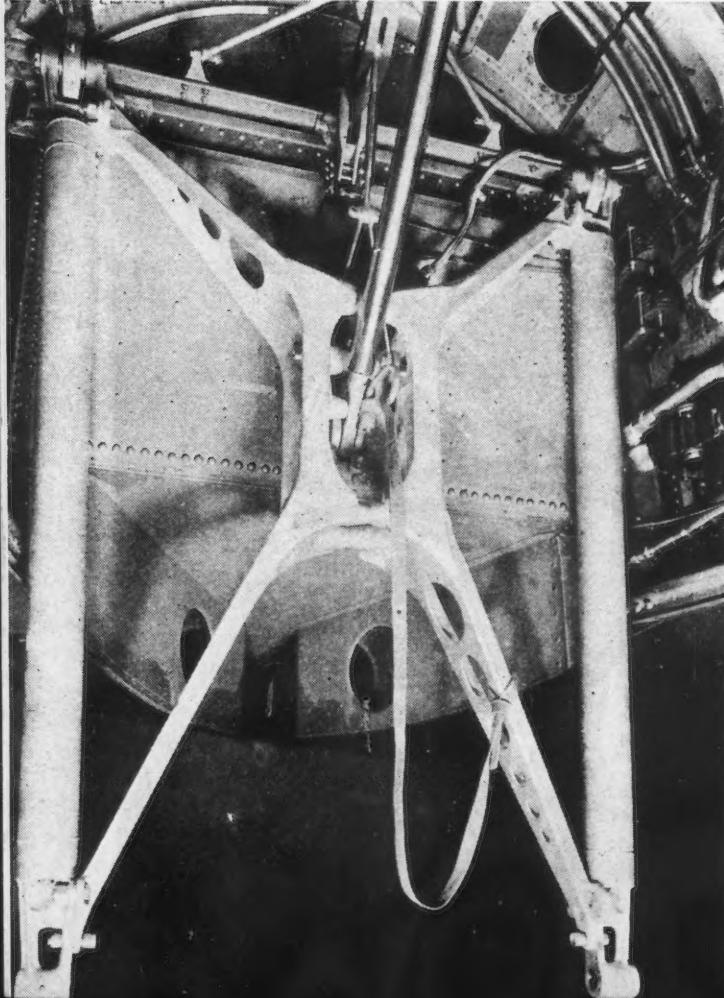
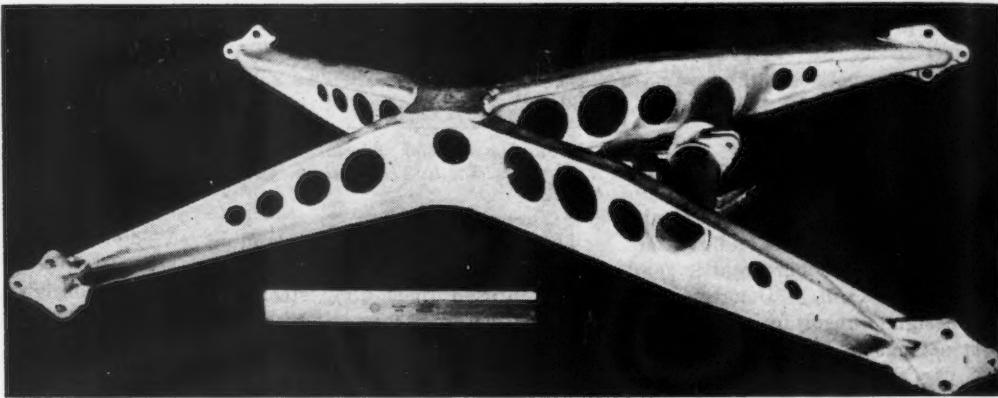


FIG. 7—Forged steel bolted truss construction of C-47 cargo plane landing gear.

large, long and thin alloy steel forgings were selected initially as the most suitable construction for the principal truss members (see Fig. 7). This forged design might have proved the final one except for a number of problems that arose during production. Large drop hammer facilities for forging these members were limited. It was not practicable to produce these forgings with less than a  $\frac{1}{8}$  in. thick web, which required producing the  $\frac{1}{8}$  in. web thickness by expensive milling. Because of the size and shape, forging die breakage and scrap developed with the result that deliveries were unreliable. Large

milling machine facilities for web-milling were also limited, which meant new equipment or tying up machines that could be better utilized.

The welded design, produced by assembling simple press-formed steel strut members of the same alloy, overcame all of these difficulties. The necessity for machine work was reduced to a minimum by forming the pieces essentially to size and accurately assembling pieces by welding in fixtures. Increases in production did not require expensive new equipment while the breakage of dies was avoided by substituting press-forming for forging. A press-formed type of strut of similar design could easily be made larger and stronger without difficulties, which difficulties with the forging process would have increased. Savings of critical alloy rough material were not only important from a shortage standpoint, but from the savings possible in the cost of materials. Table III shows these rough weight savings amount to 106 lb. per truss, or 56 per cent; while the finished weight savings were 20 lb., or 34 per cent.

To summarize, this truss redesign, by changing from the forging bolted construction to a press-formed and

welded member of  
(1) strength  
(2) equipment  
(3) produced  
(4) liable  
ejection  
(5) process  
(6) steel  
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welded construction, results in a number of advantages:

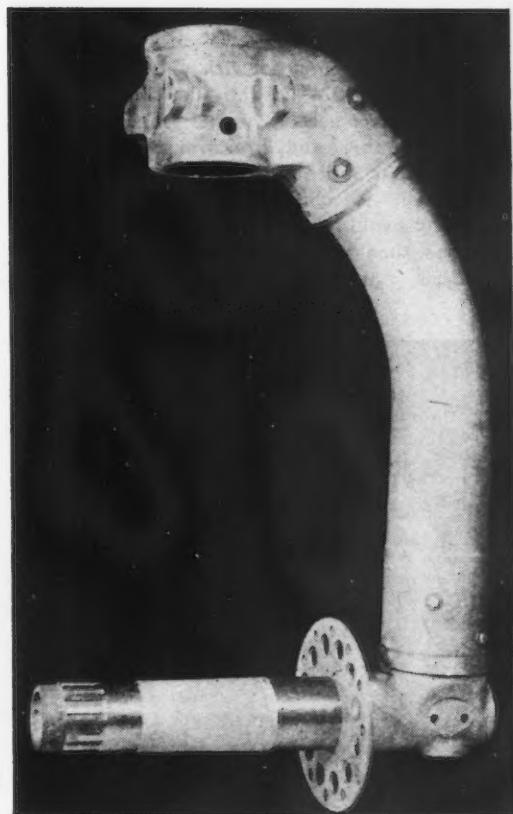
- (1) Reduced weight with adequate strength.
- (2) New forging and machine tool equipment unnecessary.
- (3) Machining operations so reduced that delivery was expedited.
- (4) Delivery controllable and reliable through avoidance of scrap rejections and die breakage.
- (5) Press-forming and welding processes more economical.
- (6) Materially less critical alloy steel required.

The evolution of the B-24 bomber landing gear half-fork is likewise interesting in that several low alloy



• • •  
ABOVE, LEFT

FIG. 8—Forged steel and bolted steel tube main half-fork construction of B-24 bomber landing gear.



• • •  
RIGHT

FIG. 8—Forged steel and bolted steel tube main half-fork construction of B-24 bomber landing gear.



• • •

steel forgings, together with a bent alloy steel tube combination, were replaced by two press-formed halves of the same type low-alloy steel material, an upper sleeve, an axle and some lugs, all assembled by welding to form a composite structure (see Fig. 7 and 9). Some savings in rough weight of alloy materials resulted, together with improvements in strength with but slight increase in finished weight (see Table III). The important factor was the elimination of the need for additional forging and machine equipment to effect half-fork delivery at the time required. Especially interesting is the assembly of the finished machined axle with the half-fork by welding and which prac-

tice contributes to economy. Axles of both seamless tube and centrifugal castings have been used with only a slight advantage in weight tolerance favoring the former. By redesigning for the welding and press-forming processes a practical and economical construction is obtained, and one proved by evolution.

At the time of initially designing the B-29 main landing gear and

The same construction opportunity is not as practical with the forged trunnion design, although it might have been incorporated. This design ingenuity of combining members so that they function as a single unit is too often overlooked during the design conception.

The trunnion story is a good one, because it illustrates utilizing the constructive help available. The

welded after heat-treatment, instead of before heat-treatment as might first be proposed. So the determination of when to weld is especially important and which factor may even affect the selection of material. Very often by welding after heat-treatment, and then only stress-relieving the welded joints at below the draw temperature for the alloy material, objectionable distortion and straightening may be avoided.

So combining such type of fabrication experience or knowledge with design conception simplifies fabrication. It may even provide a means for making some redesign either practical or more economical, or both. In the case of the C-47 cargo plane truss each press-formed half, after assembling and welding the fastening pads or feet, were separately held in shape during heat-treatment by a simple rod tack welded to these feet. After accurately assembling and welding the two halves together in an assembly fixture, the finished structure required but minor straightening. If the same rangy structure had to be heat-treated after welding the fabrication would have been more difficult and costly. The advantages of this same procedure or solution is even more apparent in the fabrication of the B-29 bomber nose frame.

Partiality for one material or process may influence selection, but it still should not alter recognition of the design facts. C. F. Kettering, during an address, cited the argument that he would see in use an all-steel airplane before an all-aluminum automobile. I believe this argument was based on faith in engineers and their understanding that each material and process has its proper application. Furthermore, that with ingenious design low-alloy steel provides many favorable characteristics that should awaken new interest in steel. However, the probability for practical selection of any one type of material to best satisfy functionally defined design problems for most auto, plane, or other structures is beyond an engineer's conception.

where members of greatest practical strength were desired, the designer selected a forged alloy steel and bolted type of trunnion. Before this original design was adopted for production, the general problem was presented for redesign consideration, where analysis showed that a press-formed low-alloy welded steel structure would better serve the purposes (see Fig. 10 and 11). Not only was the finished weight of each of two trunnions reduced 72 lb. or 33 per cent, but the rough alloy material saving was 450 lb. per trunnion, or 64 per cent.

The substitution of welding for bolting in assembly accounted for much of this weight reduction, because of greater strength and stiffness of the integrally combined welded trunnion and tube members.

assistance of the specialist manufacturer with a practical knowledge of designing and constructing special structures should be more encouraged. Too many initially designed parts lack design consultation that management could have easily provided.

In addition to product design all these cases involve problems of fabrication. How to weld the selected alloy steel, to heat-treat, to straighten, to finish, as well as how to press-form have each to be considered. Welding of these high strength low-alloy materials, though not difficult, requires proper welding electrode selection combined with knowledge of preheating and controlled welding procedures.

The separate pieces are more easily formed after annealing and often

Some of the competitive practices on marketing premium-priced materials should serve as a lesson for the steel industry. Their selection often follows reconsideration and re-conception of design, and which is an excellent procedure for displacing any material. Steel material purveyors generally have been tonnage-minded and less constructive, but they should seriously consider adopting the redesign approach. Yesterday's selections may be no more secure than the call of the next progressive purveyor.



FIG. 11—Position welding press-formed members of steel trunnion of B-29 bomber landing gear.

Lincolnweld

## Automatic Welder

### Shows Operating Economies

**E**CONOMY effected by the use of the latest equipment for automatic welding is one of the chief reasons why the use of this method is becoming so widespread. One fabricator, for example, has reduced the welding cost of hatch cover sections for cargo ships by 50 per cent compared to previous manual welding and has eliminated straightening operations that were formerly required.

The covers are fabricated by a new type of submerged melt automatic welding known as Lincolnweld, a development of the Lincoln Electric Co., Cleveland.

The automatic welding installation at the Youngstown Steel Car Co., Niles, Ohio, Fig. 1, consists of a standard Lincolnweld head, flux hopper and controls mounted on a motor driven carriage which runs on a travel beam 30 ft. long. The beam can be manually raised or lowered by means of screws, one at each end of the beam. The 24 x 7 ft. truck on which the work is mounted is hand operated and is designed so that it can later be motor driven for rapid positioning of the work. The truck is constructed of a framework of standard channels and angles supported on railroad car wheels which run on rails embedded in the floor of the plant. Thus the entire truck can be moved under the welding travel beam or drawn back clear of the beam for loading and unloading the work. A comprehensive view of the complete set-up is shown in Fig. 1. The beam and work handling equipment was built by the Youngstown Steel Car Co.

The hatch cover bases are composed of standard channels automatically fillet welded on both sides of each channel to a base plate (see sketch, Fig. 2). The work is posi-

*... In the fabrication of hatch covers for cargo ships, welding costs have been cut in half compared with manual methods. Details on the equipment are announced for the first time.*

By C. M. TAYLOR

*Vice-President, Lincoln Electric Co.,  
Cleveland*

tioned in two V-shaped yokes, one at each end of the welding truck platform so as to effect a flat position. The welding head is then positioned over the seam, Fig. 3, and the carriage automatically travels along the beam. A granular flux is deposited ahead of the welding arc to shield the molten weld metal. After welding the unfused flux is removed by a

vacuum suction unit and screened for reuse.

Welding speed for this fillet welding operation is at the rate of 30 in. per min., using 5/32 in. diameter wire electrode. Wire consumed per foot of weld averages 0.09 lb. with 0.10 lb. of flux per foot.

The second automatic welding operation consists of butt welding the

Mechanical Properties of Lincolnweld Automatic Welds

Material	Yield Strength, Lb./Sq. In.	Tensile Strength, Lb./Sq. In.	Ductility Per Cent Elongation in 2 In.
Low carbon steel such as Armco ingot iron	36,000	53,000	34
Medium carbon steel such as ship plate	49,000	68,000	31
High carbon (0.40) steel (Gear steel)	64,000	87,000	24
*Pressure vessel steel plate	55,000	74,000	27

\* Stress relieved at 1200 deg. F.

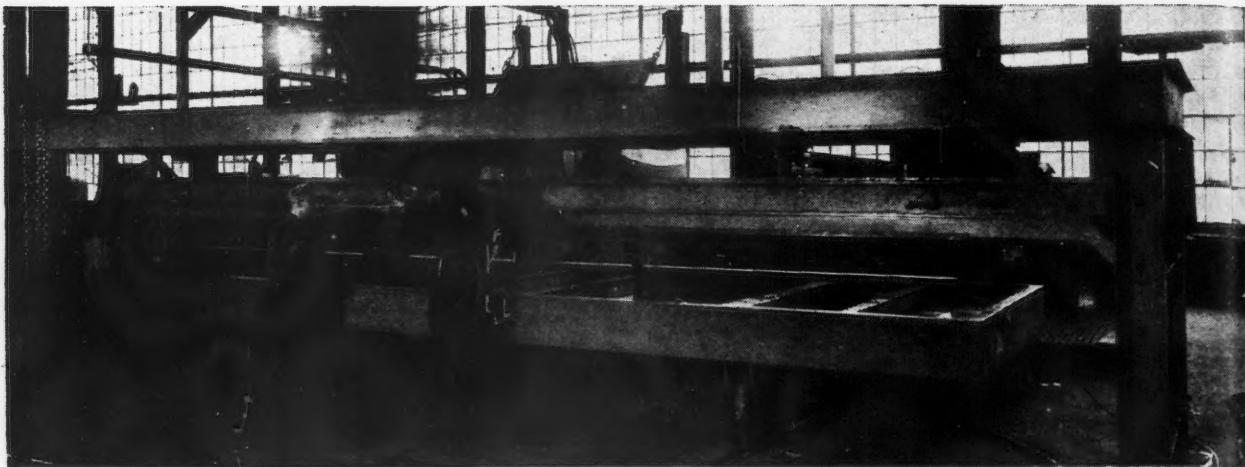


FIG. 1—General view of Lincolnweld automatic arc welding installation used in fabricating ship hatch covers.

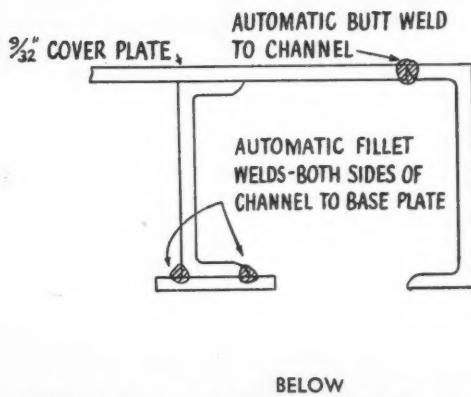


FIG. 3—Close-up of Lincolnweld metallic arc unit in operation on positioned fillet weld for ship hatch cover section.

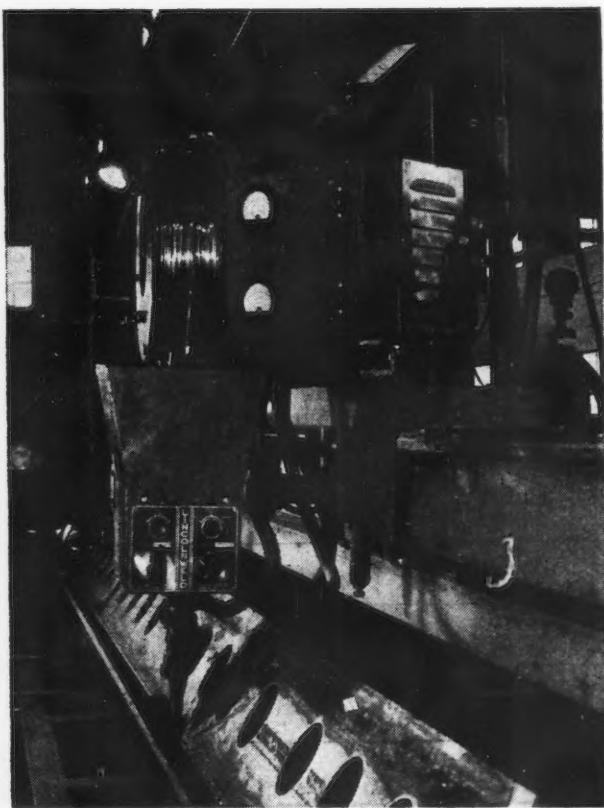
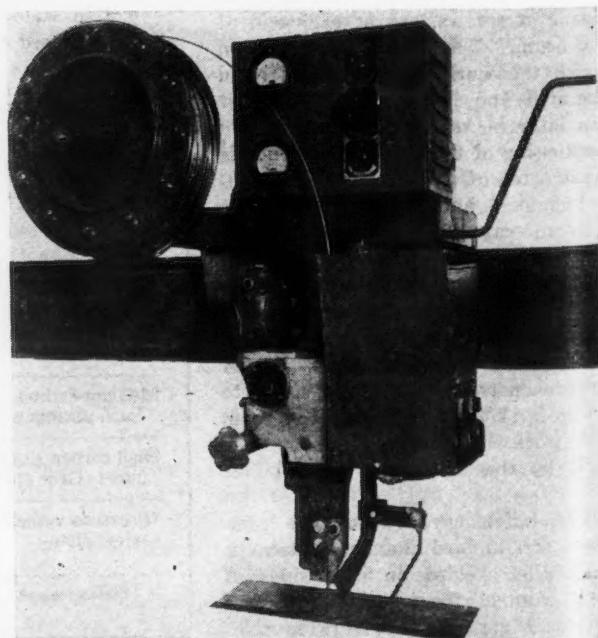


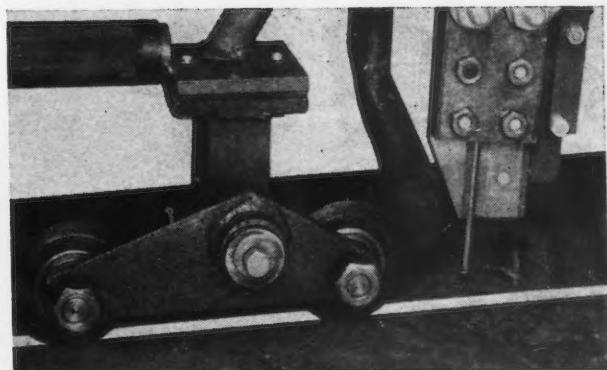
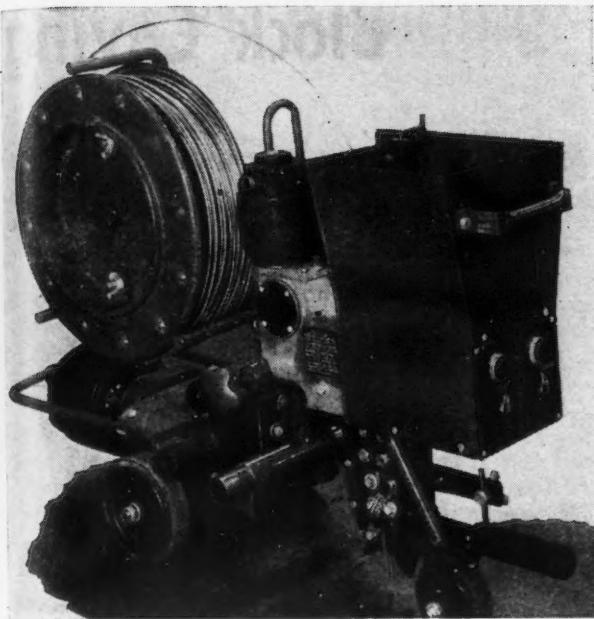
FIG. 4—Carriage type Lincolnweld mounted on overhead beam.

\*9/32 in. steel cover plate to the end channels (Fig. 2). In this instance, the work is flat positioned after manually welding a backup bead on the underside of the joint with American Welding Society specification E-6012 shielded arc electrodes. The work is then turned and automatically welded from the opposite side with 5/32 in. electrode which penetrates into the backup weld.

#### Details of Welder

This development to meet the need for a more foolproof and easier applied process has established its practicability over a period of several years during which a number of the units have successfully welded a va-





ABOVE

FIG. 5—Lincolnweld unit of the motor driven tractor type.

• • •

LEFT

FIG. 6—Roller guide for Lincolnweld tractor showing bevelled rollers in prepared butt joint of work.

riety of products. The equipment has been used in welding all types of joints, including butt, lap, T and fillet, as well as corner.

The process is designed for use with direct current, utilizing a bare metallic electrode which is fed through a granular flux deposited on the joint to be welded. Sufficient flux is applied to completely blanket the arc and the molten metal; the unfused flux is then reclaimed for further use.

Direct current offers many advantages over alternating current; such as a more simplified and positive control; ability to weld non-ferrous materials; and better control of electrode melting rate through the option of either straight or reverse polarity.

Extremely high current densities are used. For example,  $\frac{1}{8}$  in. diameter electrode may carry as much as 650 amp. compared with manual welding, this produces greater penetration and permits smaller cross-section of weld metal with resulting saving in cost and reduced warpage and distortion.

Users report that the Lincolnweld process is less sensitive to scale and moisture than conventional automatic welding methods. This eliminates or reduces plate cleaning prior to welding. In extreme cases of scale buffering with power wire wheel usually provides sufficient edge cleaning, whereas grinding and sandblasting might have been required formerly.

The exceptional quality of the welds produced by Lincolnweld auto-

matic welding is indicated in the accompanying table.

Further endorsement of the new Lincolnweld process is evidenced by the fact that it meets the welding codes, rules, regulations and specifications sponsored by the following: A.S.M.E. Power Boiler Code; A.P.I.-A.S.M.E. Unfired Pressure Vessel Code; Rules of American Bureau of Shipping; Lloyd's Register of Shipping Regulations; and the United States Maritime Commission.

The particular advantages reported for Lincolnweld over existing processes are as follows:

1. One type and grade of flux, together with one analysis of electrode, can be used with the same procedure for a wide range of steel analyses. For example, ingot iron and steels up to 0.40 per cent carbon can be welded with the same procedure. Thus, special joint preparations, changing of flux, wire analysis and welding procedure are eliminated, which is of importance to a manufacturer using automatic welding.

2. The equipment will take  $\frac{1}{8}$  to  $\frac{7}{32}$  in. electrode without changes of drive rolls, wire contacts or control. The control is extremely simple and quick acting, since there are no vibrating relays nor electric devices. The electrode will feed in either direction by means of the wire motor being controlled through a special exciter. The automatic control box has current, arc voltage and travel speed rheostats in one

compartment, and an ammeter, voltmeter and two contactors for the operation of the equipment in the others. This gives the operator quick control over voltage, current and speed when changing from one job to another.

The welding head is normally used in conjunction with a specially built motor-generator type welding set of 1200 amp. capacity. The current rheostat in the automatic control box permits a current range of 300 to 1200 amp. The unit has two exciters, one for the automatic head control and one for the welder field excitation. The welder control box has provisions for easy wiring of the automatic.

Fig. 4 shows the welding head, with flux hopper, wire reel and control mounted on a motor driven carriage. Fig. 5 shows head mounted on the portable tractor unit. This has straight wire guide for butt welding. For square butt welding, a pointer is used for following irregular seams. For prepared joints, bevelled roller guides are provided for engaging the seam, Fig. 6.

The standard head is changed from butt to fillet welding in a matter of only a few minutes. In making fillet welds the lower wire guide and flux tube are changed from straight to curved, thus permitting the head and wire reel to be left in its normal position. The wire is fed in at 40 deg. from horizontal which gives the maximum effective throat for horizontal fillet welds.



... **Exhaustion of open pit ore and wide variations in ore analysis posed operating and economic problems at the Colorado Fuel & Iron Corp. These were solved by cheap underground mining methods, ore bedding and sintering.**

OPEN pit at the Sunrise, Wyo., iron ore mine.

**F**UTURE probable decline in available open pit ore and lack of uniformity of ore are topics bandied about conversationally in eastern steel circles, but one which Colorado Fuel & Iron Corp. already has tackled. Open pit mining by C. F. & I. at Sunrise, Wyo., halted about 40 years ago when the pit became too deep to allow access by rail. For many years a milling pit operation was carried on, but eventually all remaining ore lay beneath a 200-ft. limestone capping and full fledged underground mining was necessary. Because the ore must be hauled 370 miles to the C. F. & I. plant at Pueblo, Colo., cheap mining was urgent.

Borrowing a leaf from the old Pewabic at Iron Mountain, Mich., and a superintendent experienced in block caving from Arizona's porphyry copper country, C. F. & I.'s development of a suitable block caving system, the cheapest kind of underground mining, has solved the problem splendidly. In-

stallation at Pueblo of a Robins-Messiter bedding and reclaiming system to blend the ore and a sintering plant to handle the 30 per cent fines may stand as a beacon to the future of other companies.<sup>1</sup> Output has increased 15 per cent—attributed 10 per cent to sintering and 5 per cent

<sup>1</sup> For discussion of blending see John F. Meissner (Robins Conveyors, Inc., Chicago), "Blending of Bulk Materials," A.I.M.E. Blast Furnace and Raw Materials Committee, Pittsburgh, April, 1944.

to bedding—and variations in pig iron have been brought materially into line. Where formerly there was 0.40 to 0.50 per cent variation in silicon there is now half of that and the company is able to guarantee not over 1 per cent of insolubles. Uniform iron cuts melting time, the amount of lime needed, and reduces bottom troubles.

Following a period in which Indian tribes found a greasy hematite ex-

cellent for war paint pigment, Sunrise mine during the latter part of the last century was a scene of gopher holing operations for copper occurring in the limestone capping. The copper ore soon petered out, and after starting shovel operations on exposed iron ore in 1898, C. F. & I. purchased the claims in 1901. With the virtual end of shovel operations a year later, a three compartment 6 by 18-ft. shaft was sunk 470 ft. Raises were put up under the pit and milling operations were started which as late as 1939 accounted for 40 per cent of the mine's annual production. To date more than 19 million tons of ore have been extracted, but the remaining portion of the body is sufficiently large to justify a program nearing completion which may reach two million dollars in cost. This includes a new six-compartment 750-ft. steel and concrete lined shaft, a 199-ft. headframe, and a large power and hoist house. The remaining ore will be partly extracted by block caving, which was first started at Sunrise in 1931, but the largest tonnage will be extracted by sub-level caving.

The block caving system is extremely simple and, with blocks running as high as 400 ft., extremely cheap. Excessive dilution is one of the factors which bars it for many mines, but the strong capping at Sunrise, which breaks large, reduces this problem. In order to avoid excessive development costs for a block caving system an ore body must have considerable mass and rise to a considerable vertical height. The ore itself, of course, must be relatively uniform, cave readily, and be sufficiently fine to be easily drawn through the chutes with little packing. Little timber is required — fortunately for Sunrise,

# and Ore Blending

By CHARLES T. POST

whose nearest supply is Oregon and Washington. Block caving limits selective mining, for the slope angle of the caved ore must be kept at approximately 60 deg. to prevent piping and raises must be drawn on schedule. Intermittent operation likewise is obviously impractical.

The technique utilized at Sunrise<sup>2</sup> involves main raises at 15-ft. intervals along the haulage drift, driven from a pony set over the haulage drift timber.

<sup>2</sup> See George H. Rupp, "Block Caving at the Sunrise Iron Mine, Wyoming," A.I.M.E. Technical Publication 1069, Class A, Metal Mining, No. 107.

Raises are 4 x 4 ft. in section and are driven at a 55 deg. angle for 14 ft. with a vertical section of 5 ft. or more. The tops of these main raises are connected by the grizzly drifts which are driven on 25-ft. centers, parallel to and at least 28 ft. above the haulage drifts. It is contended

that this departure from the usual right-angle relationship provides easier and better ventilation, allows higher tonnage, and is simpler. All grizzly drifts in each block are joined by a supply cross-cut connecting to a supply raise driven from the main level. Grizzly rails are set 11½ in. apart.

From the grizzly level, 4 x 4-ft. finger raises are driven nearly vertically, each side of the grizzly set, for a distance of almost 22 ft. to provide a direct outlet for caved and broken ore above the undercut level. These finger raises are untimbered.

Tops of the finger raises are connected by 5 x 7-ft. undercut drifts driven on 12½-ft. centers without

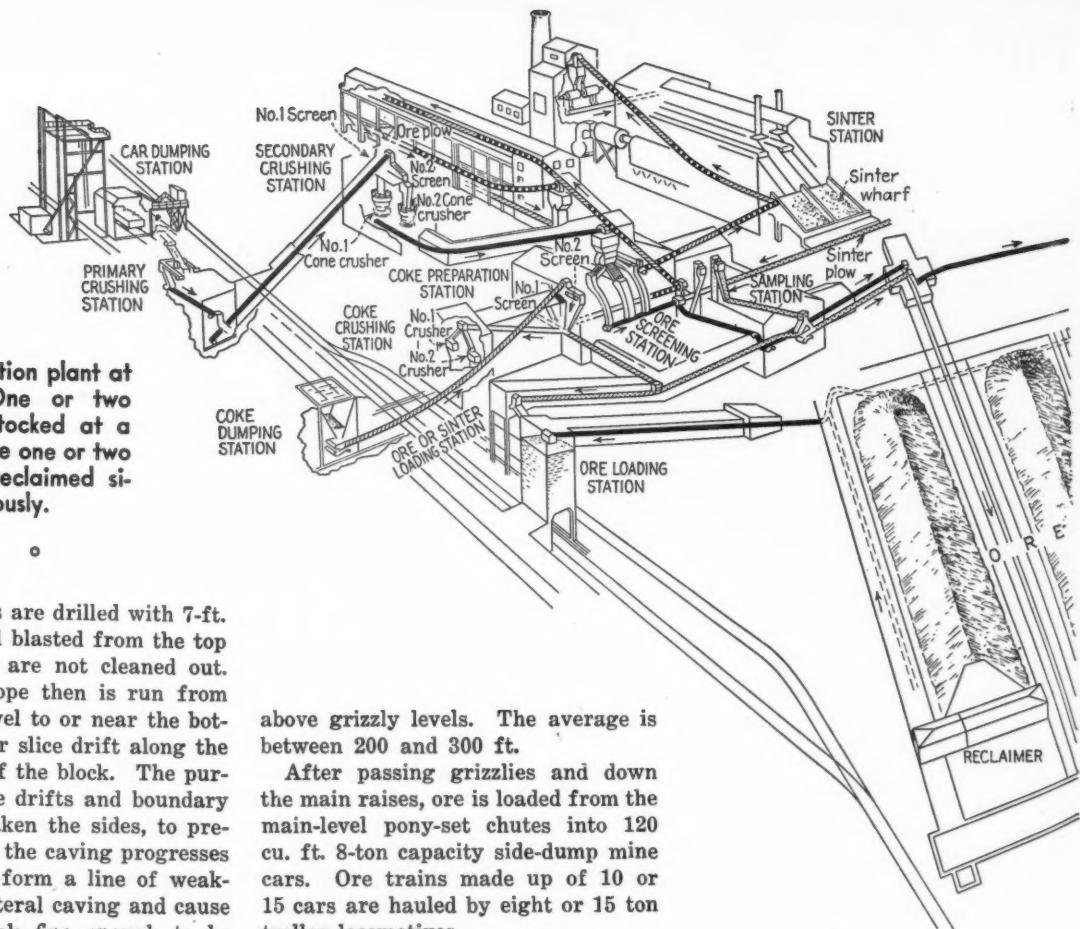
timber. The undercut drifts are parallel to the grizzly drifts, and are driven along the bottom of the ore whenever possible.

Sequence of this development depends upon the character of the ground. In hard, solid ground, all undercut drifts may be completed before any blasting of pillars between drifts is attempted. In heavy ground, main level drifts, supply raises and supply grizzly drifts are always driven, but main raises, grizzly drifts, finger raises and undercut drifts are opened up only as needed to avoid weakening the ground and to avoid excessive maintenance costs.

Boundary raises are put up at the four corners of each block to within 40 ft. of the capping in order to establish planes of weakness. Slice drifts, 5 x 7 ft. and parallel to the grizzly drifts, are driven from the boundary raises at vertical intervals of from 40 ft. to 45 ft. from the capping to the undercut. The backs of

**N**EW headframe of Sunrise mine, shown nearing completion, is 199 ft. high, one of the tallest in the country. New power and hoist house in background, also is part of the new two million dollar development program at the mine





RE preparation plant at Pueblo. One or two beds may be stocked at a time, and likewise one or two beds may be reclaimed simultaneously.

these slice drifts are drilled with 7-ft. stoper holes and blasted from the top slice down, but are not cleaned out. A shrinkage stope then is run from the undercut level to or near the bottom of the lower slice drift along the foot boundary of the block. The purpose of the slice drifts and boundary raises is to weaken the sides, to prevent arching as the caving progresses upward and to form a line of weakness limiting lateral caving and cause the ore to break fine enough to be handled through finger raises.

Actual caving of a block is initiated first by drilling the pillars between the undercut drifts with jackhammer holes and the backs of the drifts with stoper holes. Pillars are drilled and blasted in a strip 30 to 45 ft. wide for the full width of the block, starting at the extremity of the block and retreating toward the shaft. Blasting removes a horizontal slice of ore 14-ft. thick, and the unsupported back begins to break and cave of its own weight. The broken ore drops into the finger raises and down to the grizzly position. Fine ore drops through the grizzlies into the main raise. Oversize lumps are either drilled and blasted or broken with pneumatic pavement breakers to pass through grizzlies. Care is taken to avoid dilution from adjacent mined out areas or from the schist side walls by restricting the open space between the solid back and broken ore as the cave is kept working upward. Additional strips 30 to 45 ft. long are blasted and the ore is drawn on a definite schedule to keep a 60-deg. angle of broken ore in the cave. A flatter angle induces piping and dilution from the overlying capping. Height of ore being caved varies because of the irregular shape of the deposit, but has been as much as 400 ft.

above grizzly levels. The average is between 200 and 300 ft.

After passing grizzlies and down the main raises, ore is loaded from the main-level pony-set chutes into 120 cu. ft. 8-ton capacity side-dump mine cars. Ore trains made up of 10 or 15 cars are hauled by eight or 15 ton trolley locomotives.

At the new shaft ore is hoisted in 8 gross ton skips to screening and picking equipment in the headframe, thence to three ore bins for loading. Three sizes, 11 in. x 5 in., 5 in. x 2 in., and 2 in., or any combination of these sizes can be shipped. A waste rock bin also is provided. A double drum Nordberg hoist, with variable rope speed up to 1500 ft. per min., provides hoist capacity of 4000 tons per 8 hr. shift. For the cage, an Ottumwa hoist, with set rope speed of 800 ft. per min. is provided.

The prevailing ore at Sunrise is a red, earthy hematite, somewhat similar to Mesabi ore, with some black specular hematite, and minor amounts of stalactitic forms of hematite and soft ocherous limonite (principally in the now flooded Chicago ore body). Source of blast furnace problems prior to inauguration of ore bedding, however, were inclusions of thin, irregular streaks of pinit, a hydrous aluminum-potassium silicate.

Typical analysis range (wet) of shipments is:

silicates is:  
56 to 58 per cent Fe.  
10 to 18 per cent silica plus alumina,  
with aluminum varying from  $2\frac{1}{2}$  to  
9 per cent.

0.05 to 0.065 phosphorus

0.05 to 0.06  
0.05 sulfur

0.05 sulfur.

0.07 to 0.09 manganese

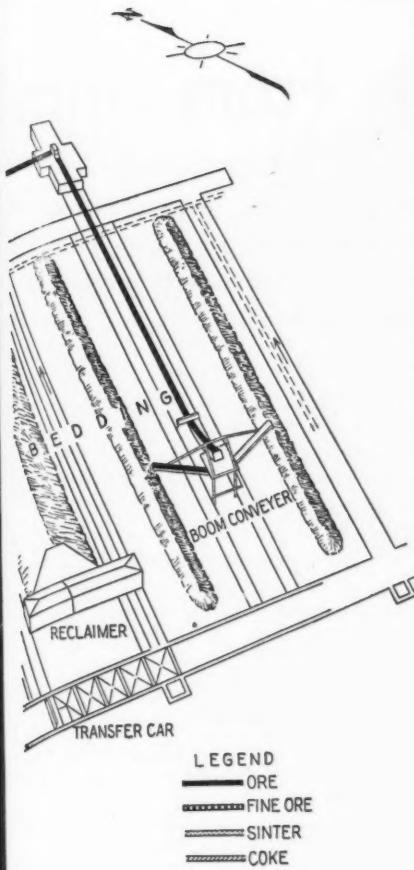
0.5 to 1.0 lime.      1.00 to 1.25  
 0.2 to 0.5 magnesia      per cent.  
 5 to 7 per cent moisture.

Approximately 30 per cent of the ore is minus  $\frac{1}{4}$  in. and 12 per cent minus 100 mesh, which is excellent for purposes of block caving, but which makes necessary sintering at the Pueblo plant.

Upon arrival at Pueblo<sup>3</sup>, each car of ore is pulled onto an all-over car

<sup>3</sup> For flowsheet at Pueblo, see Harvey Linhardt, "Ore Preparation Plant the Important Role in Defense Production Records," *C. F. & I. Blast*, Pueblo, May 12, 1944.

dumper, with capacity of 800 tons per hour. The car dumper operator either automatically or manually controls the raising and tilting of the car of ore through an angle of 155 deg., discharging the ore onto a metal conveyor. At the primary crushing station, ore passes a 5-in. grizzly with oversize reduced by a 48 x 60 in. jaw crusher. The material then travels via belt conveyor to the secondary crushing station, checked en route by a weightometer. Material failing to pass a 2 in., square, single deck Gyrex vibrating screen enters a surge bin which feeds two Symons cone



two, removes it. A triangular shaped harrow, corresponding to the face of the bed, is tilted from a support at the base of the reclaimer until its teeth contact the ore uniformly. Forward motion of the reclaimer gouges the teeth into ore, and at the same time a side-wise 2 ft. reciprocating motion uniformly rakes the ore from the entire cross sectional face of the bed. The ore thus removed drops to a plow conveyor, attached to the bottom of the reclaimer, which in turn pulls the ore to a belt conveyor running the length of the pile. This conveyor is installed in a concrete trench to insure cold weather operation. The trench conveyor then discharges onto a main conveyor leading to a concrete car loading bin.

The stacker and the two reclaimers are moved to the desired positions for piling or reclaiming by shunting them onto a transfer car located in a pit at the far end of the ore beds. One or two beds may be stocked at a time, and likewise one or two beds may be reclaimed simultaneously.

At present there are four beds, but provision is made for possible addition of two more. The capacity of the system for stocking ore in the beds is 450 net tons per hour; and for ore plus sinter it is 575 net tons per hour.

The capacity of the system for reclaiming from the piles is 400 tons for each reclaimer, or a total of 800 tons per hour.

Fine ore, which has passed from the screening station to storage bins then is sintered. Extraction from the bins is through a continuous slot by means of an automatic traveling four armed plow which has changeable speed of both extraction and traverse. Discharged onto a continuous belt the fine ore goes to an elevated surge bin, which in turn feeds two revolving table feeders. The ore tables discharge onto a belt carrying coke breeze from storage. (Coke breeze is screened and crushed to size before storage in three 90-ton bins). Both ore and coke breeze table feeders (from the bins) are controlled by remote control from the burner floor of the sintering plant. Ore and coke breeze are joined, after discharge onto another belt, by sinter fines rejected after sintering because of size and this material travels to an elevated surge bin serving the sintering plant proper.

The surge bin feeds through agitators to two pug mills, where, with water added, the mixture is pugged, then discharged to belts leading to the distributing spouts for loading each of the sintering machines.

Each of the two Dwight-Lloyd sintering machines is 102 ft. long, and is composed of 124 pallets with six 72-in. wide grates making up each pallet. Coke breeze screened out at the coke plant and blast furnaces is used for fuel. Delivered by railroad cars to an unloading track hopper, it is belt conveyed to a receiving hopper in the coke preparation plant, adjacent to the sintering plant. Here it is fed onto either one or two 3/16-in. Gyrex vibrating screens. Oversize goes to two hammer mills, having a rated capacity of 45 tons per hr., connected in circuit with the screens. Material passing the screens goes to belt to four storage bins whence it joins the fine ore as described above.

The sintering machine pallets, loaded to a depth of 14 in., pass under a combustion furnace fired with coke oven gas which ignites the coke breeze on the surface of the load. The pallets then pass over a series of suction chambers which suck the surface ignition through the entire depth. The suction fans are capable of pulling 137,000 cu. ft. of air per min. at 28 1/2 in. static pressure ( $H_2O$ ). Each is driven by a 1250 hp. motor at 900 rpm.

By the time the material has traveled the length of the pallet train the coke breeze has been burned out, the fine ore has been fused into lumps producing in effect a synthetic magnetite ( $Fe_2O_3$  to  $Fe_3O_4$ ). The sintered ore leaves the train at a temperature of less than 500 deg. F, the empty pallet train looping under to return to the head of the line in the manner of a belt conveyor.

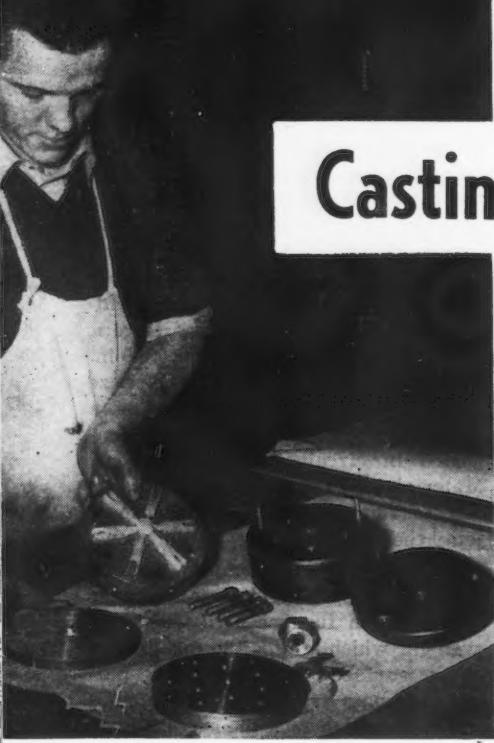
The sintered ore is discharged onto a brick lined cooling wharf. Here it is subjected to a water spray, if not sufficiently cool, before being pushed onto a belt conveyor by a traveling plow. After passing a sampling station the sinter is belt conveyed either to the bedding field, for blending with the coarse ore, or directly to a railroad loading station for transport to the blast furnace stock bins. The sintering department has a rated capacity of 2150 tons for 24 hr. operation, but as much as 2400 tons has been achieved.

A control panel is located in each of the four sections of the plant (ore crushing and screening, coke preparation, sintering, bedding) on which signal lights show the operating status of the other sections, and from which any section of the plant can be started or stopped. Individual controls are interlocked so that if trouble develops at any point, movement in that section is automatically stopped at its source.

crushers, each with a capacity of 400 tons per hour. Reduced to minus 2 in., ore is belt conveyed to the main ore screening station, passes an automatic sampler, and enters a large surge bin. The ore then is discharged onto any one or a combination of three sets of single deck Gyrex vibrating screens. Minus 1/4 in. ore passing the screens is belt conveyed and discharged through an automatic double winged tripper into a series of seven concrete storage bins serving the sintering plant. Total capacity of these bins is 3000 tons.

The coarse ore (1/4 in. to 2 in.) passes a Geary-Jennings type automatic sampler and a weightometer and is belt conveyed to the ore bedding area. The conveyor terminates at an automatic double armed stacker or tripper, which travels back and forth the length of the bedding area distributing the ore on either side in thin layers which eventually become piles of triangular cross section. These piles, or "beds," are approximately 600 ft. long, and, when full, comprise about 25,000 tons each.

As ore is needed by the blast furnaces, a reclaimer, of which there are



# Casting Cutting Tools From High

... In a Ford sponsored project setup to take care of disabled veterans, small high speed steel cutting tools are being cast to shape by the "lost wax" refractory mold process, with a few production refinements added.

sponsored by Henry Ford, who takes a direct interest in its vocational training program for veterans having a medical discharge. The student-workers receive board and a daily wage of \$3. They buy their own clothing. An opportunity to take employment in one of the Ford plants is offered to the men when they are ready to leave and go to work, but they are free to go where they wish.

The art of one of the latest of industrial processes is imparted with thoroughness at this veteran's school. That the fruit of their learning and work are precision tools which find their way into daily productive use is a token of the high seriousness with which the rehabilitation program is regarded at Camp Legion.

The casting of turbosupercharger buckets\* by the "lost wax" process from Vitallium, an alloy with exceedingly high strength at elevated temperatures, has been an application that focused much attention in the in-

dustry. It was felt that precision casting would be an economical method for making cutting tools of complex shape from high speed steel since it would eliminate costly machining operations. The tools would need only to be finished by grinding. Judging by the experience at Camp Legion, cutting tools point to another successful application of the precision casting process.

\* For a description of turbosupercharger bucket casting and for a more detailed description of precision casting, some of the elements of which are illustrated in this article, the reader is referred to the following articles published in THE IRON AGE: "Precision Casting of Turbosuperchargers," Feb. 10, 1944; "Industrial Precision Casting by a Manufacturing Jeweler," Sept. 7, 1944; "Equipment and Material for Precision Casting," Nov. 9 and 16, 1944.

At the Camp Legion shop an ingenious multiple mold has been developed, in which several patterns can be made with a single injection of the

**S**POT facers, circular form tools, side mills, end mills, and angle and keyway cutters are being made in a pilot precision casting plant at Camp Legion, Dearborn, Mich. These tools are made from high speed steel scrap, salvaged and melted down in the Ford Motor Co. plant at Dearborn. Camp Legion is

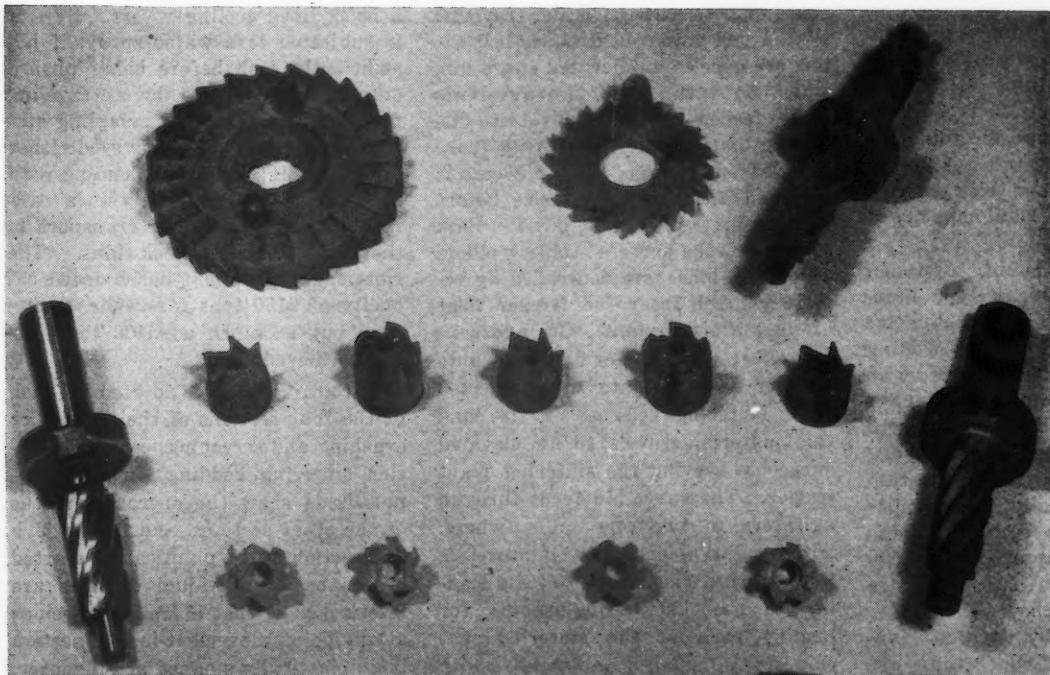


FIG. 2—Wax patterns used for making cutting tools from high speed steel. At top right is a wax pattern for a small slab mill. The metal casting is shown underneath, and at the extreme left the finished ground tool. Patterns for spot facers are shown in the middle row and keyway cutters in the bottom row.

# Speed Steel Scrap

• • •

By J. ALBIN

• • •

wax. The time consuming operation in making the patterns is that of closing the mold preparatory to the introduction of the wax and opening the mold to remove the patterns. By

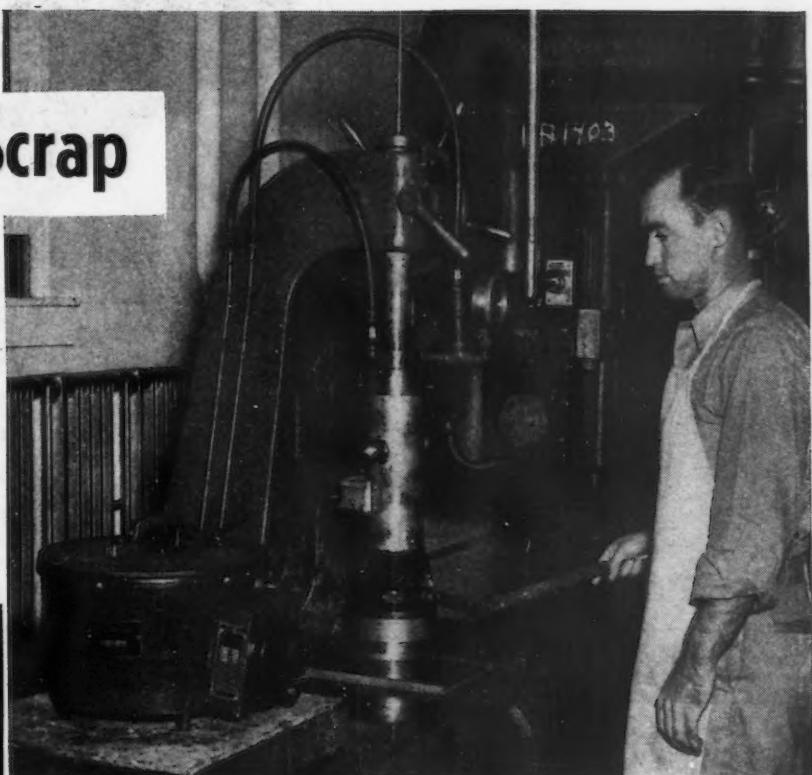
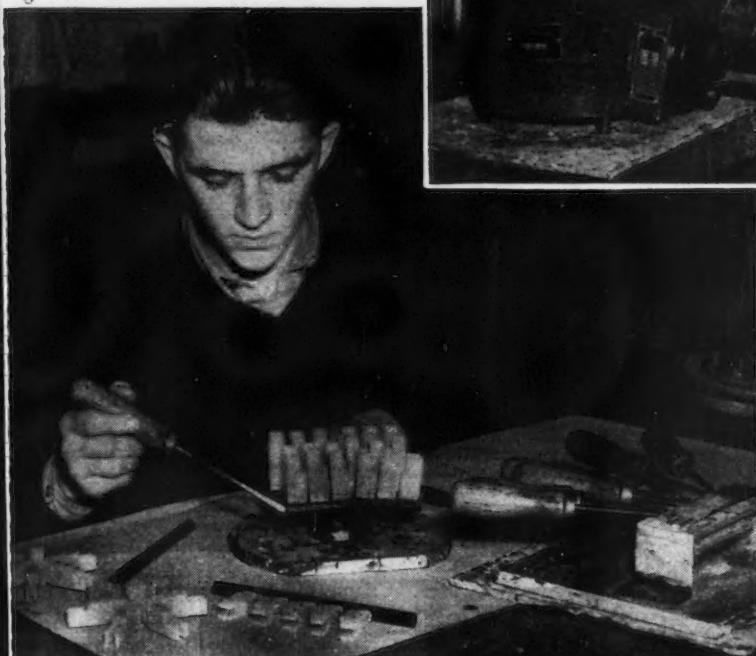


FIG. 3—Wax injection machine designed for use with the circular mold illustrated in Fig. 1.

LEFT

FIG. 4—The gating operation. Wax patterns are separated and mounted on rods of sticky wax.

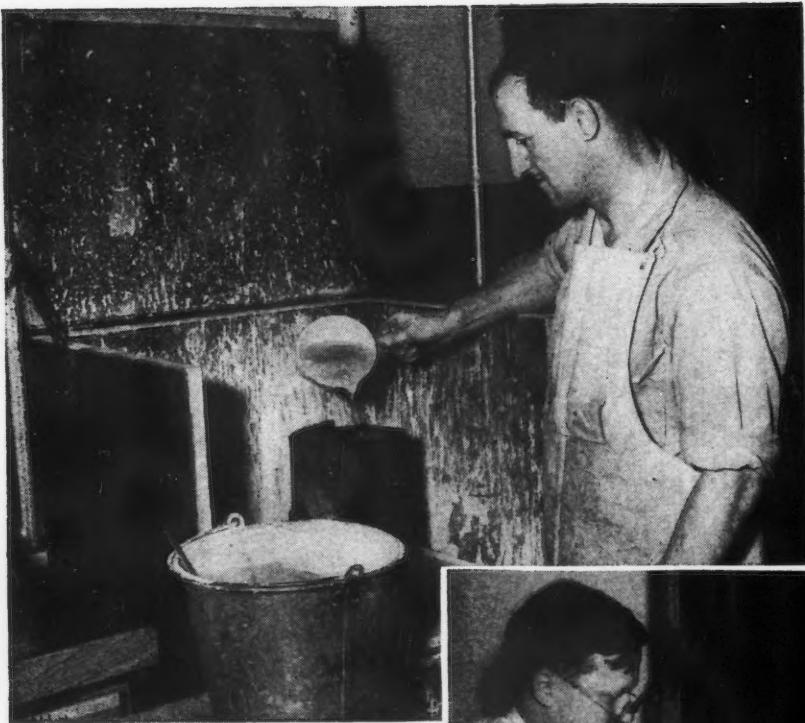
BELOW

FIG. 5—In preparing an investment for high temperature steel alloy, siliceous powders are carefully mixed with special liquid binder. Note the asbestos lines in the flask, at right, to prevent excess binder from running over during subsequent tamping.

using the mold which the operator is shown holding in Fig. 1, as many as six patterns can be obtained in about the time it takes to produce one pattern with the customary mold. The darker mold, shown on the table in the illustration, is made of plastic and has been found as effective as the soft metal molds ordinarily used. Wax patterns for casting the spot facers shown in Fig. 2, came from this plastic mold.

Once more necessity proved to be the mother of invention of this novel development. Here the necessity happened to be the fact that the veteran handling the molds had the use of only one good arm, and to whom the handling of the large metal mold occasioned strain. Ford technicians experimented with several substances





ABOVE

FIG. 6—The investment is being poured over the patterns in a flask resting on a vibrating table for eliminating air bubbles.

RIGHT

FIG. 7—After the wax has been volatized and mold cooled to proper casting temperature it is removed from this well insulated electrical oven.

BELOW

FIG. 8—Melted high speed steel is poured into the cavities of the investment from a specially designed electric furnace. Pigs made from melted down high speed steel scrap are on the shelves.



before hitting upon a general purpose thermo-setting plastic which is many times lighter than soft metal. A refinement to the multiple mold consists of replaceable inserts in the holding or matrix portion of the mold the wax patterns being cast in the inserts.

The advantages of the inserts may not be apparent at first. In removing the patterns from the mold, some students inadvertently scratched or dented the interior surface. In some cases it was necessary to scrap the entire mold; an expensive procedure. By using replaceable inserts, losses from this cause have been considerably lessened. Another distinct advantage of the replaceable insert is that, since each is made from the

same master part, uniformity of parts can be maintained.

The wax injection machine, shown in Fig. 3, is especially designed for use with the type mold described. Wax is first melted in the heater shown at right, and thence transferred to the vertical reservoir in the machine, where it is retained at appropriate temperatures by an electrical heating unit. Pressure on the surface of the wax is supplied by the operator who manipulates the pump handle. After the mold has been located on the fixture or table, the reservoir is lowered by an arbor arrangement so that the opening of the mold is tightly forced against the orifice of the injector. Greater wax pressures can be utilized since there is no need for the operator to exert manual force to hold up the mold to the injection machine. Raymond Rausch, general superintendent of the River Rouge plant, designed this machine for the school.

Depending upon the dimensions of the patterns, the group may be removed, connected together, or individually. In the gating operation the wax patterns are separated from each other and mounted on wax rods. These in turn are located horizontally with respect to the sprue holder, Fig. 4.

In preparing the investment for the high temperature steel that is used in making the tools, siliceous powders of different meshes are carefully proportioned and then mixed with a binder that is approximately similar in composition to hydrolyzed ethyl silicate solution described in the article on precision casting that appeared in THE IRON AGE, Nov. 9, 1944. The

slurry is slowly poured about the wax patterns established in the flask. Note in Fig. 5 the use of the asbestos lining within the flask which serves as a cushion for the expansion of the investment during its setting and heating phase. After the investment has been poured, it is permitted to solidify on a table responding to a vibrating device, Fig. 6, which helps eliminate air bubbles.

The flask is then placed in an electrical oven, Fig. 7, and heated gradually to 1350 deg. F. or over. At this temperature all the wax will have volatilized and only the cavity originally occupied by the wax remains in the investment.

After it has cooled to proper cast-

ing temperature the flask is then carried to an electric furnace where it receives the melted metal, Fig. 8. The casting as here shown is done by direct pouring, instead of by the centrifugal method. The temperature of the metal is always taken before casting. After the castings have cooled to room temperature, they are separated from the gates by an abrasive cutoff wheel. The cast tools are finished to size and sharpened on grinding machines which are located in the machine shop adjacent to the casting unit.

Students are taught machine shop practice in connection with the making of the molds, as well as the finishing operations.

## Adjustable Anode Rack Aids Plating

FASTER plating of irregularly shaped parts and more uniform metal deposits are being achieved by the Glenn L. Martin Co., Baltimore, through the use of a new adjustable anode rod invented by William G. Evans of the plant and equipment department and William C. Shaefer of the company's detail manufacturing division.

With the new device it is possible to quickly and conveniently move the anodes to the most advantageous position in relation to the work being plated, thus permitting faster plating of irregularly shaped parts and rapid and positive adjustment to accommodate several types of plating work without electrically disconnecting the anodes from the source of power. At the same time the proper placement of the anodes made possible by this adjustable rod provides a more even disposition and finer texture of the plating material and reduces the amount of current required.

Designed for use with elongated, mass production plating tanks, the new installation consists of brackets welded, bolted or riveted to the walls of the tank to which steel plates or arms insulated on either side with phenol fiber are pivotally attached. At the outer end of these plates or arms are swivel fittings on which are mounted annular clamps containing insulators which surround and support the anode rod. The insulators are formed in two halves so that they may be easily installed and clamped in place around the rod. Anode baskets containing chunks or balls of the metal to be deposited are hooked over and supported by the rod.

Current is supplied through a flexible cable attached to one end of the rod, while an insulated adjustment handle is provided at the other end. The rod installation is of sturdy design capable of supporting several hundred pounds of anode material, which can be moved with hardly any effort.

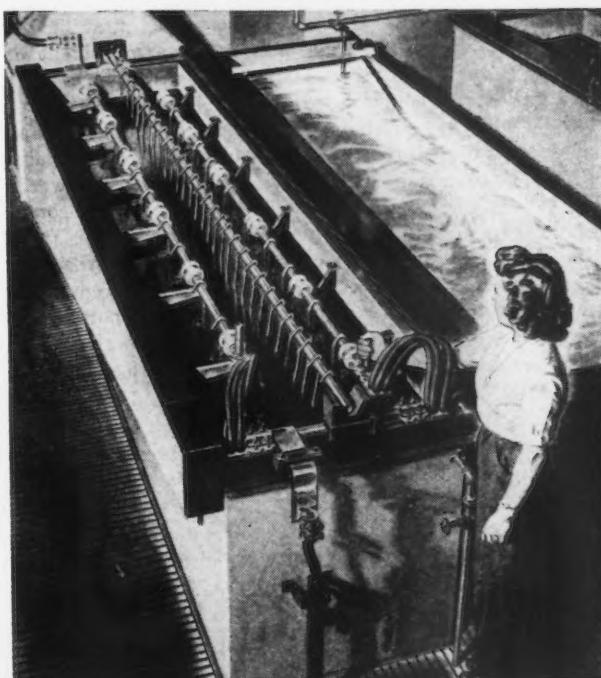
In use the operator lowers the work to be plated into the tank and then by means of the insulated handle moves the anode rod to place the anodes in the most advantageous position for the parts being plated. When the plating is completed, the

cycle is reversed. It makes little difference whether one batch is similar to another, and the whole adjustment process requires only seconds instead of the long periods of time consumed with previous rod mounting methods.

In the Glenn L. Martin plating rooms the new rod installations are already credited with saving countless manhours, and in addition have improved the quality of output and cut down on rejections due to coarse textured or uneven coatings. Designs for the adjustable rod will be made available to interested manufacturers of plating equipment under license.

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USE of an adjustable, insulated rod from which anode baskets are suspended permits rapid adjustment of the distance between anodes and work to suit the size and shape of product being plated.

• • •



# Safe Operation

## Of Solvent Degreasers

... In spite of bad practices in many plants it has been proved that degreasing can be efficient, economical and entirely safe, if a few simple rules are followed. The few instances of trouble have been traced to a lack of knowledge and understanding of the properties of the solvent, or the proper operation of the equipment, both phases of which the author covers in this article.

By L. P. LITCHFIELD

Service Manager, Solvents Div., Electrochemical Dept., E. I. du Pont de Nemours & Co., Wilmington, Del.

SOLVENT degreasing became established during prewar years as a standard cleaning procedure but the suppliers of the equipment and chemicals have been able to furnish new and improved machine designs and operating techniques to meet the vastly increased production required by the war. Thousands of new degreasers have been manufactured for war production. Inexperienced hands have often installed the machines and operated them. Normal supervision and control have not always been possible, and the order of the day has been production with little emphasis on cost accounting. Despite these conditions there have been comparatively few troubles, due largely to the inherent soundness of the process and equipment.

Essentially a degreaser consists of a tank to which heat is applied at the bottom to boil the solvent within the tank. Trichlorethylene is the principal solvent used in the process, but perchlorethylene may be advantageously used in some cases. Vapors are held within the machine by a condenser placed around the inside walls near the top and the distillate drains into a trough which carries it back to

a storage tank or another compartment of the machine. The work is suspended in the vapor zone so that the pure liquid solvent is condensed from the vapors, rinsing the parts free from grease or oil. If stubborn insolubles must be removed, the work may first be immersed in boiling or warm solvent or it may be sprayed with warm solvent. In every case, however, the work leaves the machine through the vapor level and is washed with condensed, uncontaminated solvent. The work remains in the vapor zone until condensation of the vapor stops. At this point the work has reached the temperature of the boiling solvent. It is then raised above the vapor level where it quickly dries before removal from the machine.

Trichlorethylene is a very dense liquid, being nearly one and a half times as heavy as water. Its vapors are four and one-half times as heavy as air. This makes it possible to maintain a definite vapor line in the degreasing machine and keeps losses into the air at a minimum. The boiling point is comparatively low (188 deg. F.) which permits the use of low steam pressures and also simplifies the removal and handling of the work

after cleaning. Because of the low latent heat of the solvent, metal parts condense large quantities of the vapor. The latent heat of trichlorethylene is 103 B. t. u. per lb., less than 1/9 that of water. This means that a metal part will condense more than nine times as much trichlorethylene by weight as it would steam. In addition, the low latent heat requires much lower cooling capacities and heat input for machine operation and solvent recovery.

The corresponding properties of perchlorethylene are similar to those of Tri, with one major exception. The higher boiling point of Per (250 deg. F.) requires higher steam pressures and necessitates special care in handling the hot work on leaving the machine. In addition, some alloys may be adversely affected by the higher temperature of the boiling solvent and vapor.

An important characteristic of both Tri and Per is non-inflammability at ordinary temperatures. The chemicals do not produce a flash by either the closed cup or open cup method.

### Toxic Chemicals Employed

Because degreasing employs a toxic chemical, care must be exercised in the operation of the process. All of the chlorinated solvents act as narcotics and inhalation of the vapors may produce nausea, dizziness, headaches, and a general ill feeling. Trichlorethylene and perchlorethylene, being the least toxic of the chlorinated hydrocarbons, however, are rapidly eliminated from the body, and these symptoms will disappear quickly on access to fresh air. From existing medical knowledge, it can be assumed that no permanent effects on the functional organs will be found even after repeated exposure of short duration to fairly high concentrations of vapor.

The acute or immediate effects of

excessive exposures to any toxic materials are often revealed in the form of fatigue, and this is true with Tri or Per. Workmen may attribute this fatigue to overwork or to some common ailment. Indeed, the effects are much more noticeable when the individual is over-tired, has not eaten properly, is in need of sleep, or the victim of a cold, hangover or other malady. A healthy person is less susceptible than one who is not so sound. Early effects must not be ignored if harmful exposures are to be avoided. Unconsciousness resulting from extreme exposure should be treated by artificial respiration, preferably under the direction of a physician.

Frequent contact of the skin with

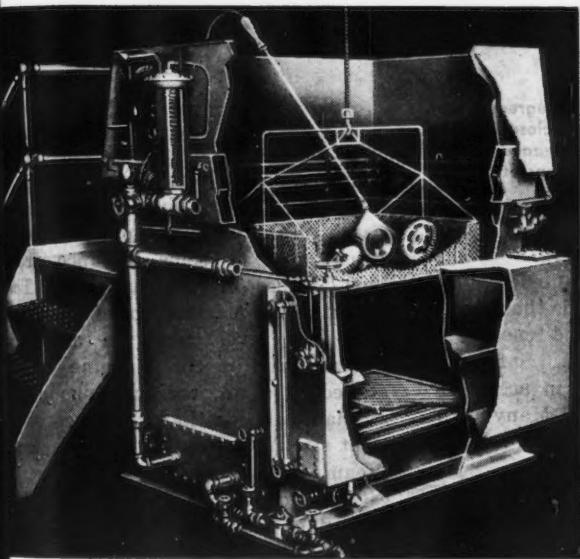
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either solvent may produce excessive dryness due to the extraction of natural oils. Very dry skin may, of course, crack open and invite infection.

Because of these potential hazards, the solvent should be used only in equipment designed for the purpose. Modern degreasers that are properly maintained are regularly operated without endangering the health of the workers.

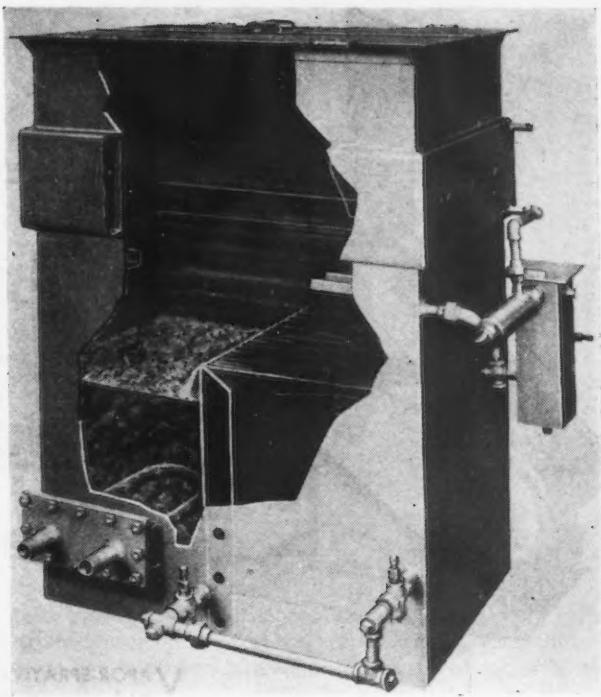
Occasionally a workman will find pleasure in the psychic effects of inhaling the vapors. Such individuals may be inclined to handle solvent or operate equipment carelessly, and should be changed to other work.

The "maximum allowable concentration" of trichlorethylene or perchlorethylene for an 8 hr. working day, suggested by the State of Massachusetts and accepted by most hygiene authorities, is 200 parts per million. (See Table I.) The validity

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#### RIGHT

**T**WO compartment degreaser, steam-heated. This cutaway view illustrates the principle of degreasing in which solvent vapor is condensed, drained into the trough and then into the unheated compartment. The work is first immersed in boiling solvent, then in clear warm solvent, then raised through the vapor for final cleaning.



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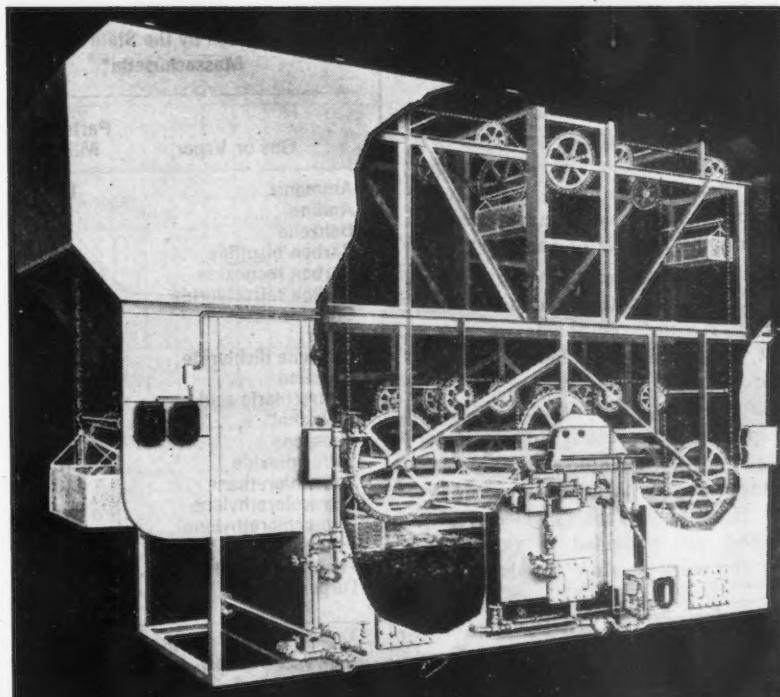
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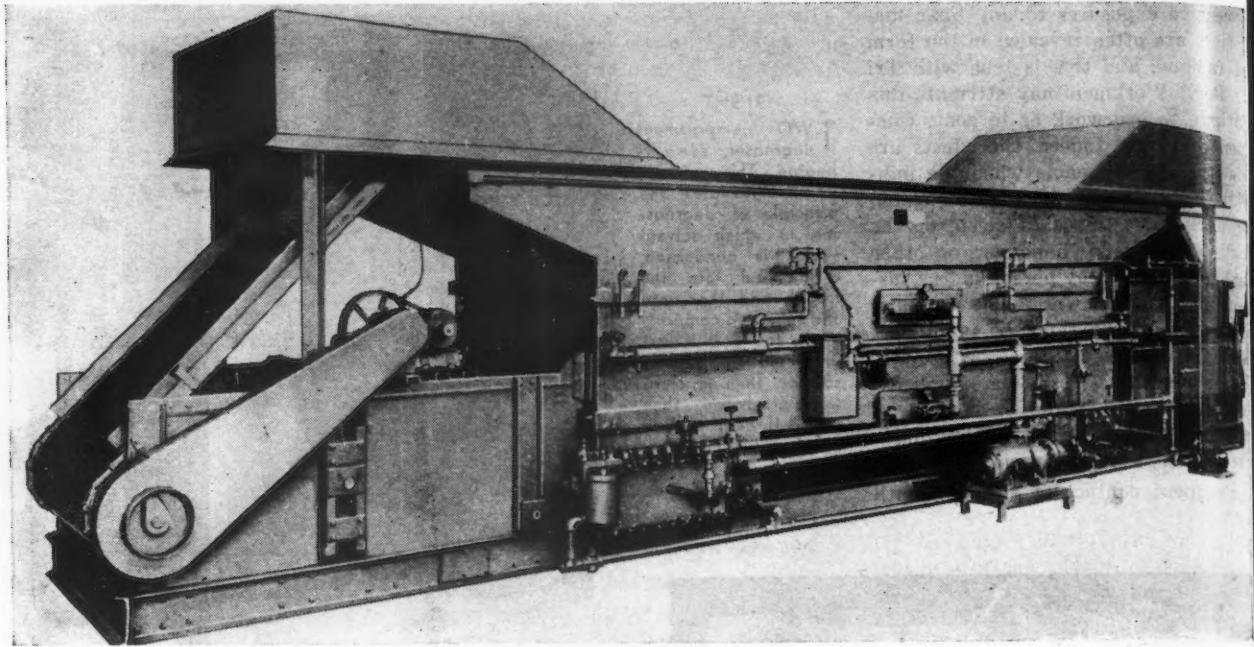
**S**TEAM-HEATED vapor-spray-vapor machine. Basket of work, lowered by an electric hoist, is being sprayed below the vapor line prior to a final rinse in the vapor. During idling periods, vapors are condensed, drained into the trough and then into the storage tank. Pump delivers this clean solvent to the spray lance when required.

• • •

#### BETWEEN

**T**HREE-COMPARTMENT conveyorized machine, fully enclosed. By means of the cross-rod conveyor system, the rate of entry and removal of the work is exactly controlled.





of these so-called "threshold limits" is supported by recent research of Seifter (9) and by the work of Carpenter (10).

It is fundamental that if a degreaser is to be operated safely, it must be designed and constructed along sound engineering lines. Experience has shown that it does not pay the user to attempt to build a degreaser since homemade machines invariably cause trouble. A machine should not be designed and recommended by the manufacturer for each particular job. The kind and amount of work to be cleaned and the cleaning requirements must be considered. In addition, the manufacturer can assist in planning for the most desirable location in the production line for efficiency and safety.

It is true that most safe practices will also provide efficiency. This is a happy situation for the safety engineer whose rules and regulations must necessarily not hinder production and the quality of the work.

Machines are designed with due regard for production requirements, with particular emphasis on heat input, condensing surfaces, thermostatic controls, water separators and cleanout doors. The design of racks is especially important to minimize the load on the machine and allow for racking the work to avoid liquid drag-out. Hoists, preferably electrically operated, are provided to raise and lower the work at slow speeds.

#### Installation Factors

Installation should be carefully supervised to make sure that a suitable

VAPOR-SPRAY-VAPOR degreaser with mesh conveyor, fully enclosed. In this machine, small parts are cleaned without handling or loading into baskets.

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location is chosen and that proper piping connections and mechanical adjustments are made. Safety devices must also be set in accordance with the best practice. Many points

must be covered in installing degreasing equipment to insure safety and efficiency. The machine should be located in a large room, free from drafts and at some distance from open flames or hot surfaces. The height of the machine above the working floor level must be carefully planned and if the machine is installed in a pit, the area should be mechanically ventilated and of sufficient size for convenient maintenance. Steam pressures must be properly established or gas burners provided with flues installed, according to accepted safety rules.

Except for ventilating pits, exhaust ventilation is not ordinarily necessary. In special cases where, for one reason or another, good practices are inoperative or ineffective, mechanical ventilation may be advisable. Such facilities should be provided only after consultation with the manufacturer of the machine. All such exhausts should, of course, be disseminated outside the building.

At a conspicuous location near each degreaser, a suitable operating instruction card should be permanently posted. Safety precautions should be included. In addition, a warning plate of ceramic finish or other durable material should be permanently placed on the machine in the most conspicuous position. This plate should warn of the toxic nature of the solvent and of the danger of entering the machine for cleaning.

To avoid back-pressure, water outlets from condensers should never be connected directly to sewer lines, but installed so as to drain into an open-

TABLE I  
Code for Maximum Safe Concentrations of Some Common Toxic Substances  
Suggested by the State of Massachusetts\*

Gas or Vapor	Parts Per Million
Ammonia.....	100
Aniline.....	5
Benzene.....	75
Carbon bisulfide.....	15
Carbon monoxide.....	100
Carbon tetrachloride.....	100
Chlorine.....	1
Ether.....	400
Ethylene dichloride.....	100
Gasoline.....	1000
Hydrochloric acid.....	10
Methanol.....	200
Phosgene.....	1
Sulfur dioxide.....	10
Tetrachlorethylene.....	10
Tetrachlorethylene (perchlorethylene).....	200
Toluene.....	200
Trichlorethylene.....	200
Turpentine.....	200

\* From Journal of Industrial Hygiene & Toxicology, Volume 22, 1940—Page 251.

sight device such as a funnel. This is one of a multitude of special piping connections which only a specialist can be expected to know.

Needless to say, when repairs or relocation of a machine are being considered, all of the requirements of an original installation must be met. In no case should welding be attempted on any part of a degreaser until all solvent has been removed and the machine thoroughly ventilated.

### Operation of Degreasers

Before a degreaser is used for routine production, the manufacturer's representatives should instruct operators, foremen and department heads in the procedures for operating and periodically cleaning out the machine. If possible, one person should assume responsibility for supervision of degreasing operations. Also it is preferable for only one man to operate a machine on each shift.

The most important point for degreaser operators to remember is that each machine has been designed for a specific type and volume of work. The method and speed of handling and the size of work loads should not be changed without previously consulting the machine manufacturer.

The machine should be operated so as to create a minimum disturbance of the vapors. If excessive loads are handled, a drop in vapor level will result. Consequently, air will be sucked in and mixed with solvent vapor. When the vapor line is gradually restored, these mixed vapors will be forced out of the machine, and will contaminate the surrounding air. Work should be entered and removed as slowly as possible and should remain in the vapor until it has reached the vapor temperature, as evidenced by the stopping of condensation. The maximum vertical speed should be about 11 ft. per min. Wherever possible, electric hoists should be used. Slushing or spraying must be carried out with the nozzle well below the vapor level in order to minimize vapor disturbance. In being transferred from one compartment to another, the work should be moved below the vapor line, if possible.

All work should be thoroughly dry before removal from the machine. At proper speeds of removal, heavy parts having small surface areas can be withdrawn continuously. However, work with large surface areas, notably baskets of small parts, requires extra time in the freeboard zone before removal.

The level of the boiling solvent should never be allowed to drop below

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ULTRAVIOLET photometer used for measuring solvent contamination of air in the working area. Sensitive to both trichlorethylene and perchlorethylene, this instrument makes possible immediate recognition of concentrations of vapors that may be unhealthful. It is made by the Mine Safety Appliances Co., Pittsburgh.

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the tops of the heating surfaces, as overheating of the solvent may result. When solvent is added to a degreaser, care must be taken to avoid splashing due to expansion on striking heated surfaces or hot solvent-oil mixtures.

In order to avoid condensation of moisture, the water temperature at the condenser outlet should be maintained above the dew-point of the atmosphere (about 100-120 deg. F.). The water should always be turned on before heat is applied; in shutting down the degreaser, the water should be turned off last.

Operation can continue until the solvent is severely contaminated. al-

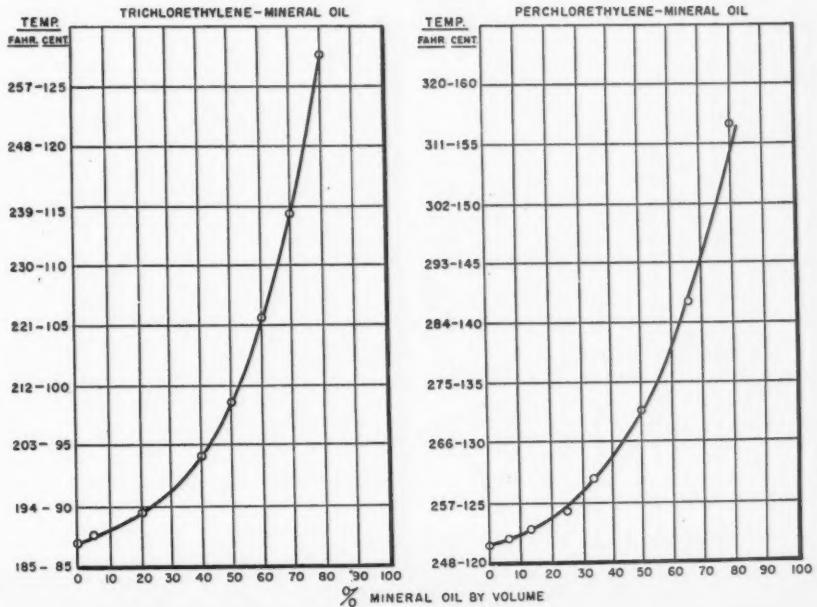
though a regular frequency of cleaning is ordinarily recommended. In many cases the cleanout cycle will be determined by accumulation of metal chips or powder. Sometimes the amount of dissolved oil will be the controlling factor. As the oil content of the solvent increases, its boiling point is raised, making distillation more difficult. Curves are shown for trichlorethylene and perchlorethylene, indicating the elevation of boiling point caused by increased percentages of mineral oil. The temperature of the boiling, dirty solvent is thus an indication of the contamination. Cleanout is advisable when the temperature reaches about 195 deg. F.

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INCREASE in boiling point of trichlorethylene and perchlorethylene mixed with various percentages of mineral oil. The fact that the boiling point rises is an index of the contamination of the solvent.

### BOILING POINT

OF



for trichlorethylene or about 260 deg. F. for perchlorethylene. These figures correspond to oil concentration of about 30 per cent by volume.

### Recovering Solvent

Solvent can be completely recovered from oil residues if proper equipment and procedures are used. The best practice is to use a still especially designed for the purpose. Residues may be piped directly to the still from the degreasing machine, eliminating air contamination and handling by the operator. Transporting solvent or solvent-bearing residues in open containers should be avoided, particularly when they are hot, and proper masks should be used if solvent vapors are to be encountered. Solvents can also be recovered by distillation in the degreaser itself.

If solvent is reclaimed in a gas or electric machine, the temperature of the residual oil may reach its flash point. If low-flash oils are involved, an advisable precaution against fire is to extinguish gas pilot lights before draining the machine.

Under no conditions should water be added to boiling solvents, as a flash distillation may occur. The steam distillation temperature of trichlorethylene is 164 deg. F.; of perchlorethylene, 190 deg. F.

### Cleaning Out the Degreaser

After solvent residues have been drained off, the cleanout doors should be opened and the machine cleaned from the outside. If a large unit must be entered for cleaning, this should be done only after all solvent liquid and vapors have been removed or dissipated, and then only with at least one other workman in attendance on the outside. A workman entering a machine for any purpose should wear a mask which provides a supply of outside air.

The addition of soda ash or trisodium phosphate to water is sometimes recommended for boiling out degreasers prior to recharging. Caustic soda (sodium hydroxide) should not be used. A final flush with hot water will leave the machine ready for recharging with clean solvent.

Each degreaser installation should be regularly inspected by experienced technicians to check the overall conditions of the tank and all of its control devices. Methods of operation and the observance of good safety practices should be covered at the same time. Routine maintenance is as important for a degreaser as for any piece of operating equipment, and will pay

TABLE II  
Possible Sources of Waste of Solvent  
in Degreasing Operations

Losses into atmosphere from improper heat balance or improper cooling control
Drafts over the degreaser
Improper handling of work:
Racks too large
Poor racking of parts—liquid dragout
Use of wooden racks or rope slings
Too rapid entry and removal of work
Slushing above vapor line
Removing work from vapor too soon
Removing small parts (cleaned in bulk) from freeboard area before completely dry
Covers off during idling
Loss of solvent and stabilizers during distillation
Throwing away residues containing solvent
Losses due to poor housekeeping, necessitating frequent recharging of machines with new solvent
Leaks in pumps, valves, etc.
Excessive moisture in machine
Drop in vapor line due to excessive loads, heavy racks, low heat input, etc.
Cleaning overalls or other garments in the machine.

dividends in overall costs and process efficiency.

### Conservation of Solvent

In Table II is a list of possible sources of waste of solvent in degreasing operations. Operators should check all of these possibilities in order to insure lowest operating and maintenance costs and highest cleaning efficiency, and to eliminate potential health hazards.

If the air surrounding a degreaser becomes contaminated with solvent vapor so that the odor is bothersome, there is always a reason, and the cause can be readily determined by a simple study of the operation. When the safety of workmen is questioned, it is sometimes helpful to measure the amount of vapor in the working area. A rapid analyzer for trichlorethylene and perchlorethylene has been developed by du Pont engineers (see cut). This instrument, known as the Tri-Per Analyzer, may also be used for some other vapors. Measuring concentrations of solvent vapors in the air throughout the cleaning cycle not only makes it possible to establish the comparative hazard to the workman; it also assists in pointing out high concentrations at certain periods in the cycle. The specific cause for temporarily high values, such as drafts across the machine, too rapid entry or removal of the work or withdrawal of liquid solvent on the work, can be quickly detected and shown as parts per million of solvent in the air.

Solvent degreasing has been widely

accepted for metal cleaning where parts of all kinds are fabricated, finished or assembled. The rapid expansion of degreasing facilities during the war is an indication of postwar potentialities. Wartime experience in thousands of plants has demonstrated the practicability of the process. In spite of bad practices in many plants, and in spite of frequently inadequate and inexperienced personnel, it has been proved that degreasing can be efficient, economical and entirely safe, if a few simple rules are followed. Considering the large volume of work that is degreased throughout the country, there have been comparatively few accidents due to the toxicity of the solvent. This is particularly noteworthy because the process is new in terms of years and in view of the recent rapid increase in usage. The few instances of troubles have been traced to a lack of knowledge and understanding of the properties of the solvent, or the proper operation of the equipment. These difficulties are rapidly disappearing as all concerned become better acquainted with this tool for increased production and more efficient cleaning.

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# Increasing Fatigue Life of Heat Treated Gears

ROUNDING and polishing the gullets between the teeth of hardened aircraft gears has been found to almost triple the fatigue strength, according to M. Ulrich, of the Daimler-Benz Co., writing in the German periodical *Luftwissen*, according to a translation provided by the British Ministry of Aircraft Production. To obtain a criterion for the amount by which the fatigue dynamic strength might be raised, the apparatus illustrated in Fig. 1 was devised to set up alternate bending stresses on the teeth.

To increase the resistance to fracture of the teeth of gears already made, the following measures were adopted:

1. Chamfer at the shoulder of the teeth increased.
2. Thickness of the rim altered.
3. Grooves caused by grinding and polishing in the tooth gullet removed, the marks of the final polishing running at right angles to the teeth.

By these measures, the endurance bending force at which, after one million load cycles, no tooth fracture on a particular gear occurred could be raised from 14,300 lb. to 37,000 lb. Other tests demonstrated that where polishing of the tooth gullets was

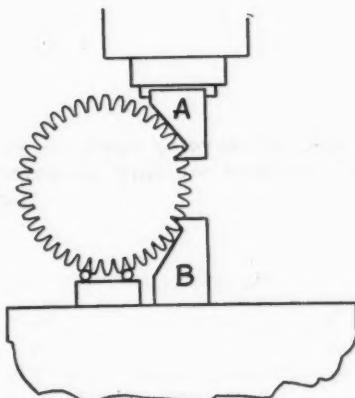


FIG. 1—Apparatus devised for testing the resistance of gear teeth to fatigue fractures.

omitted, the endurance bending strength dropped to 26,500 lb., indicating that polishing accounted for almost half the gain.

Occasionally gears were found that fell well below these values. The cause was traced to grinding heat cracks in the gullets. To prevent heat checks Daimler-Benz resorted to grinding the fillet in the gullet in the carburized state prior to hardening instead of be-

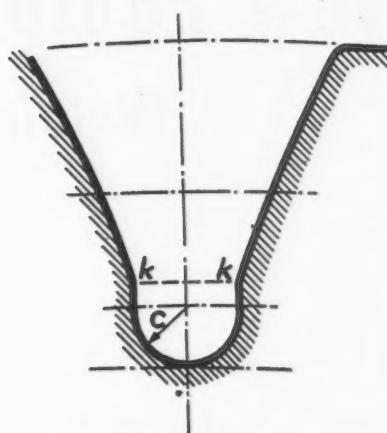
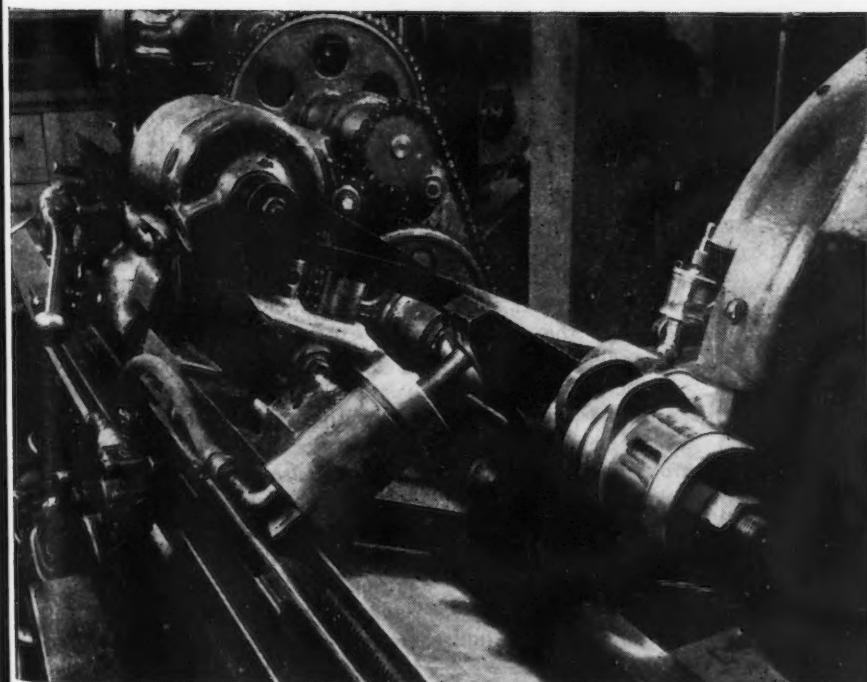


FIG. 2—Gears with polished tooth gullets of this shape were found to have greatly increased fatigue life, according to German experiments

ing carried out in the finished hardened state.

At the same time the fillet in the gullet was extensively rounded as shown in Fig. 2 so as to permit the use of a simpler method of grinding and polishing the gullet at right angles to the teeth. The edge *k* permits grinding of the tooth flanks after hardening without damaging the gullet.

## Grinding in Reverse



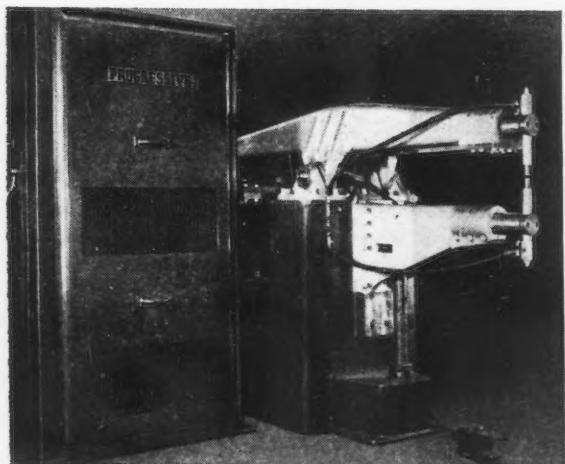
In the grinding of master cams for diesels at the Joshua Hendy Iron Works, a steel disk (right) replaces the grinding wheel ordinarily used on the cylindrical grinder pictured. A working master cam, filed to close tolerances, is held in contact with the disc through an air cylinder and pivoted fixture. The cam being ground is mounted behind the working master and is finished by a  $1/2$  hp. Dumore grinder, seen under the sight feed oiler. Note how the work spindle has been geared down to a slow speed required for this type of follower work. It requires about 1 hr. each to cut the two master cams needed for the manufacture of working cams for the engines, performed on the same setup with a large grinding wheel in the normal position.

# New Equipment . . .

## Welding

... Recent developments in resistance welders, welder controls, electrodes and welding accessories are described in the following pages.

**T**WO additions to its storage battery powered line of resistance welders have been announced by *Progressive Welder Co.*, 3050 East Outer Drive, Detroit 12. The first machine, the economy spot-welder, is a rocker arm type, completely self-contained, with storage batteries, contactor - controller and infinitely variable heat control regulator all enclosed in the base of the machine. The other machine is a heavy duty type and is designed so that both spot and roll welding can be performed on the same machine with minor changes. Both models will weld conventional steels as well as stainless steel, aluminum, etc. They heavy duty welder, illustrated, will spot weld structural aluminum up to two sections of 3/16 in. thickness. The economy model has a standard throat depth of 24 in. with other depths available. Both upper and lower arms are adjustable. Rated capacity of the machine is two pieces of 14 gage mild steel or two thicknesses of 0.040 in. aluminum. The heavy duty model is rated to handle a total of 50,000 amp. of welding current. A feature of both types of machines is that complete battery assemblies can be removed as a unit for servicing or replacement when necessary with only simple electrical and cooling water lines to disconnect.



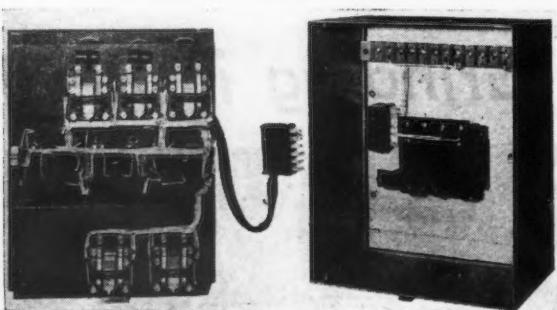
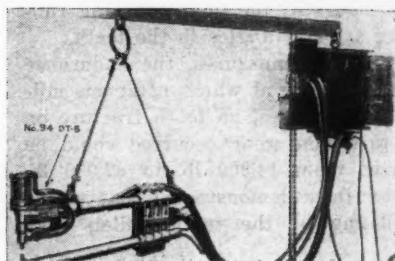
a control panel to a simple swingout, pull-plug, lift-off hand operation. Another panel of either the same or for a different type of welding can be set in just as easily. Provision of a spare control panel to replace any one of a group in service permits the inspection or servicing of all welder controls to be performed without shutting down of any of the machines.

### Weld Timer

**F**OR the conversion of timing controls to any of NEMA standard types in a few seconds, a Weltronic universal timer with interchangeable plug-in type control has been announced by *Weltronic Co.*, 19500 West Eight Mile Road, Detroit 19. The design of the complete range of weld and sequence timers, incorporating a universal cabinet and power supply unit and a series of interchangeable control panels, permits any resistance welder to be immediately available for any type of welding within its capacity. Use of a flexible cable, multi-point plug and receptacle for the interconnection between a control panel and the power supply unit plus a slotted hinge type panel mount reduces the removal of

### Portable Gun Welder

**A** PORTABLE air operated adjustable gun welder has been announced by *Eisler Engineering Co.*, 740-770 South 13th Street, Newark 3, N. J. It is a direct air operated welding machine equipped with a double acting air cylinder and the necessary operating mechanism, fully or semi-automatic, depending on the choice



of control. The power part consists of an air-cooled transformer with an eight-tap switch for heat regulation, a pneumatic or electronic actuated timer and a high-speed mechanical or electronic contactor for accurately timing the weld in speed or automatic repeat of strokes.

The units are manufactured in sizes from 30 to 150 kva.

### Welder Convertor

**A** WELDER - conversion device which makes it possible to convert 1000 amp. a.c. welding sets for use with automatic machines to manual service has been announced by *Westinghouse Electric & Mfg. Co.*, East Pittsburgh. With it the welder can be converted to serve as a power supply to six individual manual welding operations each having a current range of 45 to 270 amp. The device consists of a transformer and a group of six reactors which are fed by the

welding steps the circuit voltage which is welding. increases supply un

### Weld

**A** WE prov current a welding ho

able steel General I N. Y. Kn the timer use with a heat con spot weld phase-shif erating f cycles, the of current preheating and tempe ral voltage consistency + or - 1/2 setting. I that a G compensator b tion to cor ing curr variations netic mate welding m

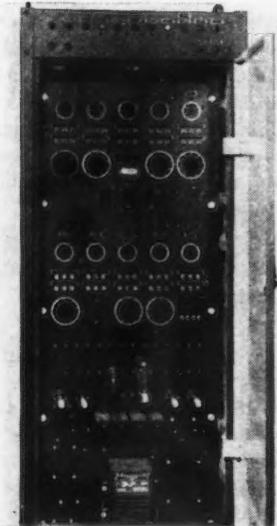
**S** POT either type have tite Engi Avenue, S

## NEW EQUIPMENT

welding transformer. The transformer steps the normal operating open-circuit voltage down from 85 to 75 volt which is more suitable for manual welding. Use of the transformer also increases the current capacity of the supply unit.

### Weld and Sequence Timer

**A** WELD and sequence timer for providing the various time and current adjustments necessary for welding heavy sections of air-harden-



able steels has been announced by *General Electric Co.*, Schenectady, N. Y. Known as Type CR7503-F170, the timer is especially designed for use with an ignitron contactor and a heat control panel. However, it can be used in combination with most GE spot welding controls which use the phase-shift method of control. Operating from 230/460/575 volt, 60 cycles, the control adjusts the time of current flow and its magnitude for preheating, welding, grain refinement and tempering. For variations in control voltage of +10 to -20 per cent, consistency of timing will be within + or - 1/2 of 1 per cent of the time setting. However, it is recommended that a GE current regulating compensator be used with this combination to correct for variations in welding current caused by line voltage variations or the introduction of magnetic materials into the throat of the welding machine.

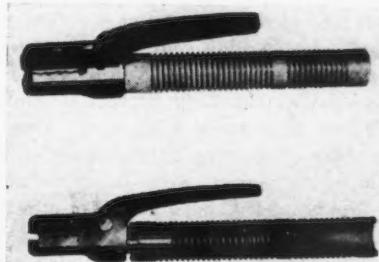
### Spot Weld Sealer

**S**POT weld sealing compounds, either flow gun, brush or spray type have been announced by *Press-tite Engineering Co.*, 39 Chouteau Avenue, St. Louis. It is claimed that

all three types of Presstite spot weld sealers have high resistance to dilute acids, alkalies and mineral oils. They are made to give a seal between sheets that are spot welded together.

### Electrode Holder

**A** N electrode holder with a heat-resisting plastic jaw cover has been announced by *Pacific Engineering Corp.*, 3123 San Fernando Road,



Los Angeles 41. The holder is said to enable the welding rod to be used down to a mere stub without the necessity of bending. Grip holds all rod sizes.

### A.C. Welder

**A** N A.C. electric arc welder for general purpose work has been developed by *Hampton Electric Mfg. Co.*, 1112 Pine Place, New Kensington, Pa. It will operate on either 220 or 440 volt supply, has a capacity of 30 to 300 amp. and will handle electrodes from 1/16 to 1/4 in. diameter inclusive. The welder has a stabilizer so designed as to counterbalance the welding current and voltage, thereby permitting a good weld even on rusty or greasy material. It is also equipped with a thermostatically controlled arcless overload cut-out which protects it against excessive overload for a long period of time.

### Heavy Coated Electrode

**A** HEAVY coated arc welding electrode for flat and horizontal fillet welding as well as for flat butt welding has been announced by *General Electric Co.*, Schenectady, N. Y. Known as Type W-27, the electrode is characterized by an exceptionally high melting rate which results in increased production and higher speeds. The electrode operates on a.c. or d.c. with either straight or reverse polarity. It is available in three sizes, 3/16 x 18 in., 1/4 x 18 and 5/16 x 18 in. and is rated A.W.S. classes E6020 and E6030.



### Electrode Carrier

**A** CARRIER for welding electrodes has been announced by *Atlas Welding Accessories Co.*, 14824 Wyoming Avenue, Detroit 21. The two-purpose case is designed to carry a supply of electrodes suspended from the welder's belt. An extra division is provided for carrying an Atlas weld cleaning tool.

### Arc Torch

**A** N arc torch for electric welding, the 9000 arc torch, has been announced by *Mid-States Equipment Co.*, 2429 South Michigan Avenue, Chicago 16. The torch is claimed to provide an electric flame of intense heat, approximately 9000 deg. F., which is a pure heat without oxygen or other gas to contaminate the weld. The torch is furnished in a.c. and d.c. models with cables, carbons and adaptors.

### Electrode Holder

**A** N electrode holder weighing only 22 oz. has been announced by *Lincoln Electric Co.*, Cleveland. The holder has a current rating of 300 amp. with ample capacity for overload. The holder will handle various sizes of electrodes ranging from 1/16 to 1/4 in. diameter. The jaws are made



of a high conducting and wear resisting copper alloy known as Lincalloy.

#### Electrode Holder

**A**N electrode holder designed to increase the usable portion of the electrode to a point right up to the uncoated end of the rod has been announced by *National Cylinder Gas Co.*, 205 W. Wacker Drive, Chicago



6. With the Shortstub holder, only  $\frac{1}{2}$  in. is needed for a tight, efficient current contact in the holder jaw. An extension of the holder itself allows the now usable stud end of the rod to be projected into the proper position for welding.

#### High Tensile Electrode

**A**HIGH tensile arc welding electrode for fabricating aircraft steels has been announced by *General Electric Co.*, Schenectady, N. Y. Known as type W-55, the electrode is capable of making a deposit of high tensile strength comparable to the mechanical properties of the parent metal. It can be used for welding in any position, including vertical welding from the top down and from the bottom up. The arc has sufficient force to keep slag from crowding the electrode when welding vertically downward and the metal sets up quickly when welding overhead and vertically upward. Characterized by its gray extruded coating, the electrode is recommended for operation on d.c. straight polarity or a.c. The W-55 is available in three sizes: 3/32 x 12 in.,  $\frac{1}{8}$  x 14 in. and 5/32 x 14 in.

#### High Speed Steel Electrode

**A**HIGH speed steel welding rod, known as *AMSCO Toolface*, has been announced by *American Manganese Steel Div. of American Brake*

*Shoe Co.*, Chicago Heights, Ill. It has a guaranteed Brinell hardness of between 575 to 675 and can be used for making composite cutting tools and for salvaging high speed steel cutters. It can also be used as a general hard surfacing rod where extreme hardness and resistance to shock is important. It is available in standard lengths and for gas or arc welding.

#### Tool Steel Electrodes

**T**HE addition of two electrodes to its regular line has been announced by *Welding Equipment & Supply Co.*, 223 Leib Street, Detroit 7. One is a moly high speed steel electrode producing typical molybdenum, high speed weld deposits at 60-64 Rockwell C hardness. The other is a hot work tool steel electrode producing carbon-moly-chromium deposits having extreme hardness and abrasion resistance at high heat with a Rockwell C hardness of 58-62. Both of these electrodes produce "hard-as-welded" deposits which can be heat treated if desired.

#### Metallurgic Heat-Seal

**A**METHOD for bonding lead foil or lead sheet together metallurgically by means of a lead-based material which forms a hermetical seal without mounting or heat-seal coating has been announced by *Reynolds Metal Co.*, Richmond, Va. The heat-seal ingredients are contained in the metal itself—a low melting point solder casing. Temperature of 350 deg. F. melts the surface metal without affecting its lead core.

#### Electric Soldering Iron

**E**LECTRIC soldering irons equipped with ground wire which minimize the possibility of the operator receiving a shock and prevent blown fuses and damage to electrical apparatus have been announced by *Hexacon Electric Co.*, 144 West Clay Avenue, Roselle Park, N. J. This is accomplished through the use of a three wire cord set, two of the three wires being regular conductors and the third wire being grounded to the outer housing of the soldering iron.

#### Weld Test Chemical

**F**OR testing welded seams on steel tanks that must be absolutely tight, *Kano Kroil* has been announced by *Kano Laboratories*, 75 East Wacker Drive, Chicago 1, Ill. A thick film is sprayed along the seams and even in the most minute opening, the chem-

ical is said to penetrate to the opposite side of the seam. *Kano Kroil* is said to be a creeping, penetrating chemical with an extremely low surface tension so that it spreads and creeps quickly.

#### Soldering Stand

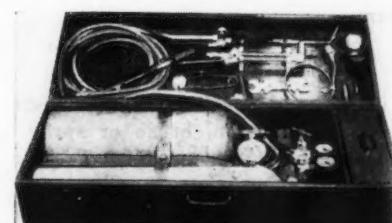
**A**N improved soldering stand, Model SS10, which is said to provide protection for the operator and increase soldering production and efficiency has been announced by *Ess Specialty Corp.*, Bergenfield, N. J. The stands are said to permit maximum freedom for work passing, to enable the operator to focus attention on the soldered joint by means of a magnifying or plate glass window. It is also claimed to provide greater protection against injurious fumes, hand fatigue, eye strain, etc. The fume stack is 3 x 9 1/2 x 32 in.

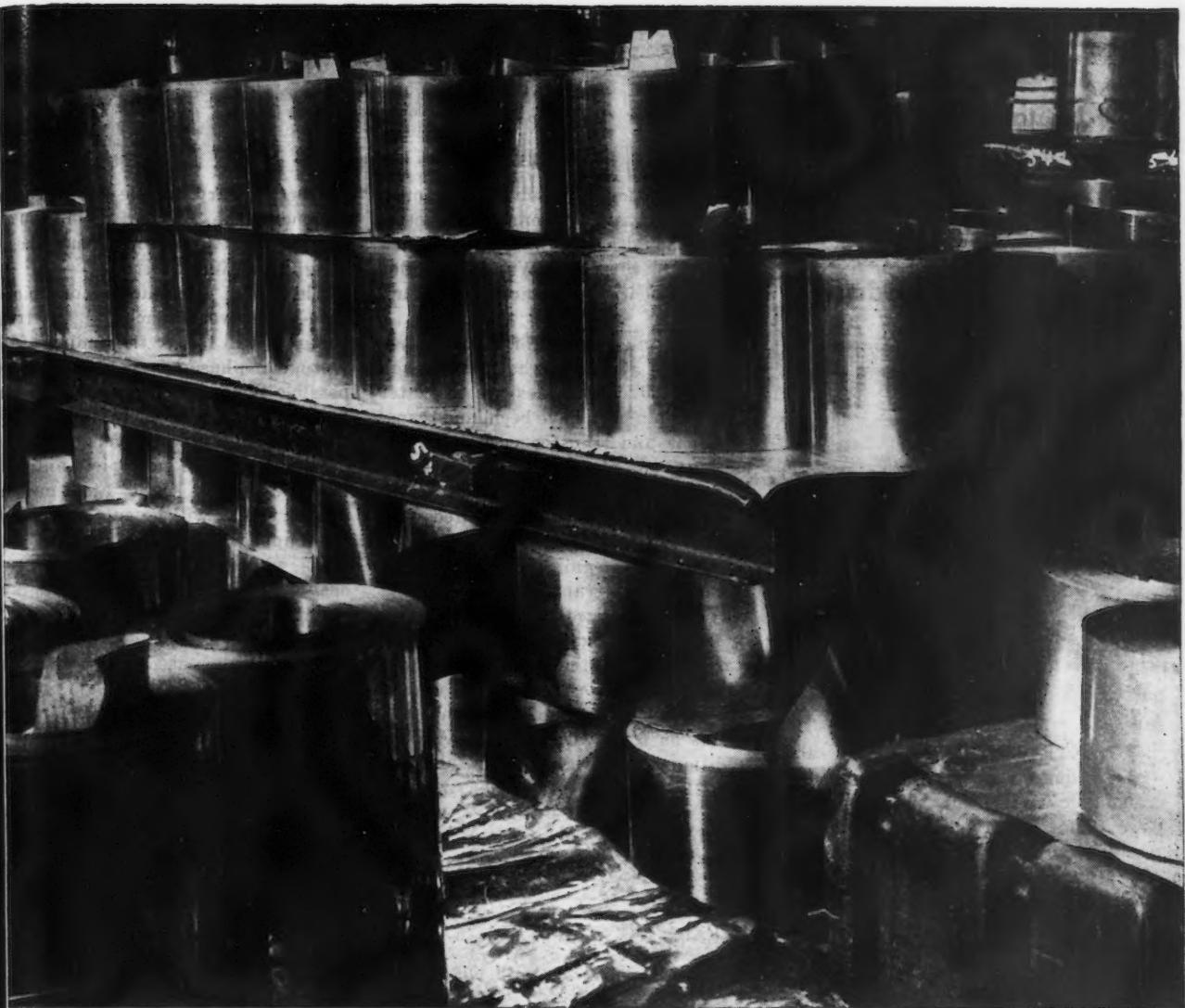
#### Cast Iron Tinning Flux

**A**FLUX designed to promote uniform tinning of cast iron before brazing has been announced by *Air Reduction Sales Co.*, 60 East 42nd Street, New York 17. Known as the *Airco Hi-Bond*, the flux is claimed to overcome the difficulties encountered in tinning cast iron due to its graphitic nature and is especially useful for tinning cast iron of high carbon and silicon content or low combined carbon analysis. It may be applied as a water mixed paste or as a powder sprinkled on the surface which has already been heated to the required temperature.

#### Gas Welding Outfit

**F**OR welding on overhead cranes and other difficult places, a portable welding outfit, No. 45-W-12 *Lintern* oxy-acetylene welding outfit, has been developed by *Lintern Corp.*, 60 Lincoln Avenue, Berea, Ohio. It is good for at least 12 hr. of continuous welding on light gage metal. It utilizes a Prestolite tank and a small oxygen tank. Plate up to  $\frac{1}{8}$  in. can be welded or brazed with the tips furnished. The cutting attachment handles up to  $\frac{1}{2}$  in. plate.





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This picture shows coils of copper awaiting final processing in a Revere plant. It comes glistening from between the finishing rolls true to gauge. It is delivered to you in the form of sheet, strip or roll in the correct temper and finish as specified and in accurate dimensions. We have been rolling copper for 144 years, and being the oldest metal-working firm in the country, know how to do it right.

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it is so easily cut, formed, worked and soldered; because of its high heat and electrical conductivity, its resistance to corrosion and the readiness with which it may be plated and tinned. In most applications it is so long-lasting as to be permanent.

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# Assembly Line

STANLEY H. BRAMS

• Military needs once more overshadow output of civilian trucks, and Army requirements again are lifted . . . Inventory standards are set forth by Auto Council.



**D**ETROIT—Hopes for an adequate supply of civilian trucks to carry out essential home front duties have received another body blow, at least for the time being, with the issuance of War Production Board Program Determination No. 713. Two paragraphs in that determination state that military vehicle output must be accomplished at the expense, if necessary, of non-military units in the event of conflict between those categories; and the scheduling of components for those trucks shall be handled in the same way where necessary. Truck manufacturers have received word of this policy, and the same information will shortly go to component producers.

Non-military truck output will actually be deferred in favor of military vehicles only to the extent required to bring military production up to required quantities for any monthly period in any plant. However, the entire truck program, military and non-military, will be considered as one program only in competition with other programs.

This does not mean that military truck output will be completed during the fore part of any one month, with civilian vehicles trailing as may develop in the latter part of the month. It simply means that when an overall monthly projection develops belief that military vehicle production will not reach quota, then non-military truck manufacture must be sufficiently cut back to enable the meeting of that goal. The War Production Board will

be the agency to resolve any conflict of this sort and determine what actual steps should be taken. Producers are asked to wire the War Production Board when such conflicts become apparent.

Meanwhile, output of trucks is accelerating at a somewhat better than anticipated rate. Axles are in better supply than they have been, and transmissions and transfer cases also are perking up, along with motors. Improvement in the labor situation in foundries and forges is credited with this development.

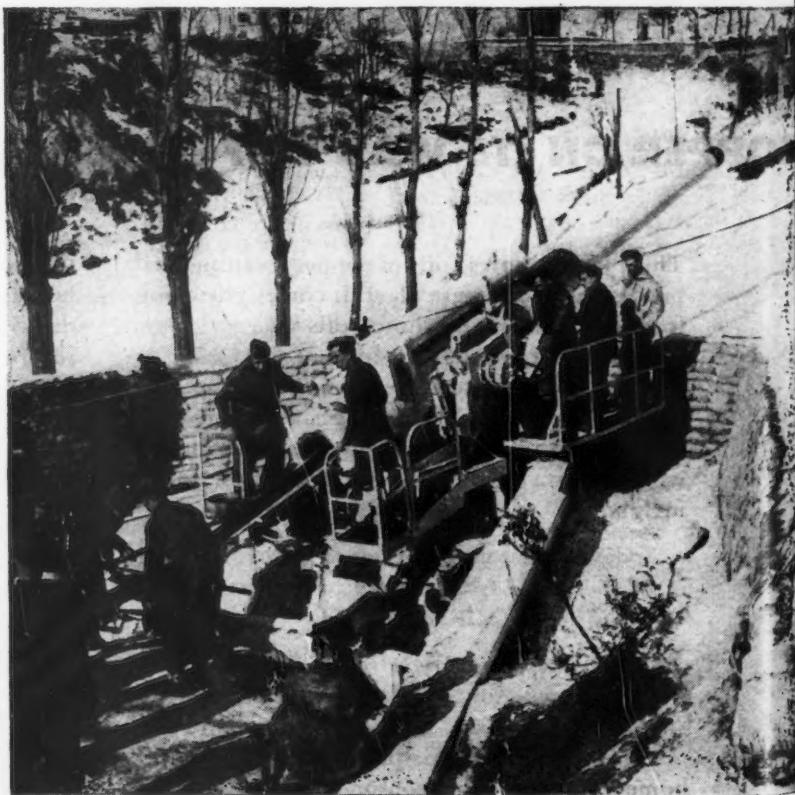
However, the gains being registered in the axle and transmission situations may be neutralized for the time being by a growing tendency among the military to reduce the number of 4 x 2 and 4 x 4 vehicles scheduled for output in favor of extension of the programs on 6 x 6 wheel drives. And in addition, the original schedules of 869,212 units for production in 1945 have been revised upward to about 911,500. All of the increase—still to be finally approved, incidentally—is

in the military vehicle classification and more than 32,000 of the 42,000 are in the light-heavy and heavy-heavy weight classifications.

There is a fair backlog of opinion that extensive cutbacks in the truck program will follow the ending of the European phase of the war, making possible the output of civilian vehicles to the extent reduced in the military sphere. This, however, may turn out to be a somewhat incomplete anticipation. Certainly light and medium weight trucks will be cut back, but it now appears entirely possible that there will be a continuation of the heavy truck manufacturing program absorbing disproportionate amounts of material and parts, in order to meet transportation needs in disrupted Europe.

A recent request from Poland for 25,000 trucks under lend-lease is a case in point; rail transportation is entirely disrupted in that country, and highway movements are about the only means possible of shipping goods. In France, too, the Germans took al-

**READY TO FIRE**—The shell on the ramming tray is ready to be loaded into the breach of a 240 mm. American manufactured howitzer, manned by a British gun crew of 12. The target is an enemy ammunition dump.



# Timely Tip for Tool Engineers

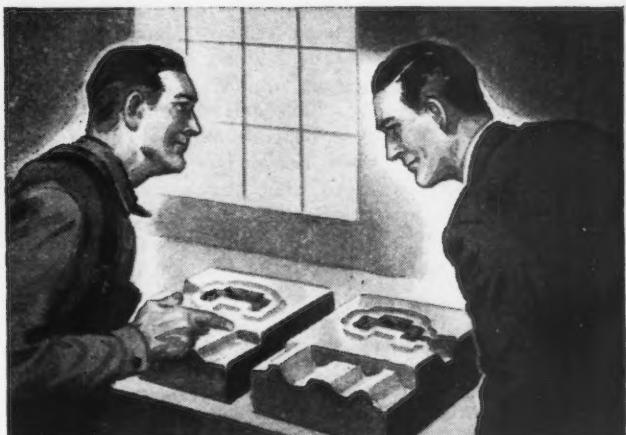


→ "When you place the orders for this equipment, I'd like to go on record as recommending Brown's tool shop. The quality and accuracy of their work is tops in my book."

here are no two ways about it . . . the better your shop is equipped, the better the quality of your work. That's why the man who is planning new tools for war now (or for reconversion later) is wise to order them from a shop that has P&W machines, tools and jigs. He can be sure of just that much better quality and precision in everything he buys. And usually Pratt & Whitney equipment turns out precision jigs and fixtures faster. Write to us for full information.



1 "Jim, we're going to need a lot of new equipment quickly—dies, jigs, fixtures, tools. Better check the tool engineers and make a list of what we'll need. I want to get the order in right away."



2 → "See this die? Accurate to a whisker . . . and that goes for everything we get from Brown. The answer's easy . . . they're Pratt & Whitney-equipped throughout—from die sinkers to Hoke blocks—and believe me, you can tell the difference."

## PRATT & WHITNEY

Division Niles-Bement-Pond Company  
WEST HARTFORD 1, CONNECTICUT



possible rolling stock with them when they fell behind the Siegfried Line, and accordingly trucks are bearing the brunt of transportation needs in that country and will continue to do so, it appears, for some time to come. Further emphasis is lent this transportation tieup in Europe by the general experience of factories reopened for Allied requirements, which find they have plenty of manpower and fair complements of machines left behind by the Germans, but are not able to find the transportation facilities to move raw materials from supply points to their machines.

It is evident that when the Nazis collapse our war requirements will diminish considerably, if not in trucks then in something else. All of which brings up a topical question—what is a good inventory description? That question has much more than academic interest, because it relates closely to the removal of government goods from a privately owned war plant. The Automotive Council for War Production is pointing out to its members that the law provides for a maximum period of 60 days in which the contracting agency must remove inventories. However, the 60-day span begins after filing of an "acceptable" inventory list. The clearing of a plant, therefore, depends to considerable extent upon knowledge within the company as to what constitutes a satisfactory inventory description.

A full commercial description is

required for all metals in mill product form which have commercial value. These inventories are filed on Form 2A of the Office of Contract Settlement. The form, heat treatment, specification, dimensions, condition, cost and occasional other details must be filled in. Where there is supplemental information having bearing on the value of the goods, that should also be written across the form underneath the description line, such as, "each coil wrapped in heavy burlap, secured with  $\frac{1}{2}$ -in. metal strips."

Alloy steel, stainless, copper and copper alloys, aluminum, silver, tin and other raw materials are classified and described similar to carbon steel. When wall thickness of copper tubing is not readily available, the use for which it was purchased must be specified. When describing surplus tool steel, the manufacturer's name must be listed, along with the form or shape of the steel, rolling treatment, finish, heat treatment or temper, analysis, thickness or diameter, width and length, along with details of any special wrapping, etc.

Inventory schedules on purchased parts, filed on OCS Form 2B must describe the items well enough so they are clearly recognizable as to produce and use. A good description of an annealing salt, for example, would show type of compounding, as "barium and calcium neutral," as well as its use, melting point, working range, and the name and address of the manufacturer.

## Over 18,000 Disputes Submitted to Detroit WLB from 1943-1944

### Detroit

• • • The extent of labor problems in the Detroit area, a storm center of management-employee relationships for the past eight years, is amply indicated by a review of the work of the 11th Regional War Labor Board here during its first two years of existence in 1943 and 1944. A total of more than 18,000 cases has been submitted to it.

During the two years from February, 1943, the Detroit WLB settled 862 of 1051 disputes referred to it by the National War Labor Board and disposed of 16,532 of 16,999 voluntary wage cases submitted to it.

During the past 12 months directive orders were issued in 540 of 651 dispute cases after tri-partite panels and hearing officers took testimony on those cases in 28 Michigan cities.

A total of 9239 voluntary wage cases affecting 570,000 Michigan workers were disposed of by either the board or its wage stabilization director.

Reviewing the activities of his agency, Louis C. Mariani, chairman of the Regional Board, said that management and labor both could help the war effort and get faster action from the board if they settled small differences between themselves. "Piling these on us only delays settlement of major issues," he said. "For we have our manpower problems like everyone else."

Of the 9239 wage cases completed during the past 12 months, 5700 of them, covering 164,000 employees, involved requests for immediate increases in basic pay rates. About 4800 of the 5700 cases, covering 145,000 workers, were fully or partly approved; the remaining 900 were not approved.

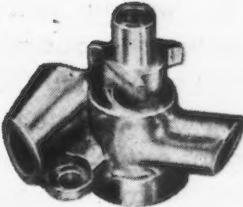
Sixty per cent of the wage cases in this past 12 months involved alleged inequalities with other plants, and 10 per cent inequities in the same plant. Nearly 40 per cent involved no change in basic wage rates, but related to peace rates, vacations, bonuses, overtime pay, shift differential pay, etc.

The average time required to process a case in the early days of the Michigan board was from six to ten weeks. Now, according to Philip Arnow, wage stabilization director of the board, the average time for handling cases is two to three weeks.

**MINIATURE ROBOTS**—A line of Marine rocket trucks looses a barrage of the self-propelled missiles at the enemy during the struggle for Saipan. Greatly improved, rockets are now an important weapon used in various forms in conflicts on all fronts.



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Plus EASY, ECONOMICAL  
FABRICATION  
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**LOWER UNIT COSTS** This aircraft fuel supply valve body was forged from Carpenter Stainless #8 (Type 303) forging bars. Our machine-turned billets from which all Carpenter Stainless forging bars are rolled, assure freedom from surface defects. The result: sound, flawless forgings for you, with minimum rejects.



**SAME DIES** as were previously used to form and blank ordinary cold rolled strip, later made this ingenious Stainless loose leaf binder. Ductile, uniform Carpenter Stainless #6 (Type 430) assured clean stamping, easy crimping, smooth bends. In addition, this satin-finish Stainless eliminated all polishing operations.



**AUTOMATICS USED** This airplane part, machined in automatics from Carpenter Stainless #8 (Type 303) bar stock, indicates what can be done with Free-Machining 18-8 Stainless.

Give Your Products  
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- Sales Appeal
- Weight Saving
- Ease of Assembly
- Freedom from Rust
- Everlasting Beauty
- No Plating to Peel
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When you consider putting new zest, greater "eye" appeal into your new or redesigned products — when you consider giving them greater strength and a higher factor of safety — when you consider endowing them with special physicals to meet unusual service conditions — the first thing that comes to mind is "Let's make it from Stainless."

But beyond these immediate sales and utility advantages, you want Stainless Steels that will work with you right from the start. Easy-working Carpenter Stainless Steels, for instance, can help your shop get into production faster. Because they form easily, blank cleanly and permit faster press and machining speeds, they smooth the way from drawing board to finished product. In addition, these Stainless Steels save time and expense in the finishing room.

Carpenter has spared neither time nor expense to bring you the easiest-fabricating Stainless Steels that ever hit your production line. The same group of stainless experts who helped make possible ductile, easy-working Stainless Strip and Free-Machining Stainless bar stock are ready to apply their experience to your problems. Let them help you select the proper Stainless for the job. Let them help you cut corners and costs in your fabricating shop.

Call in your nearby Carpenter representative now, or write us at the mill. And if you do not already have a copy, send for our 98-page book, "Working Data for Carpenter Stainless Steels." A note on your company letterhead, indicating your title is all that is necessary.

The Carpenter Steel Company • 121 W. Bern Street • Reading, Pa.

# Carpenter STAINLESS STEELS



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St. Louis, Indianapolis, New York, Philadelphia

...for  
Strength  
Rigidity  
Heat Resistance  
Corrosion Resistance  
Longer Product Life  
Sales Appeal

# Washington

L. W. MOFFETT

• U. S. foreign policy on postwar economics outlined at Mexico City conference . . . State Department expects to get firm commitment on free enterprise . . . Financial assistance by U. S. may be substantial.



WASHINGTON—The Inter-American Conference which began in Mexico City on Feb. 21 saw placed before it the outline of United States foreign policy with respect to world postwar economics.

For the first time, the country was apprised of firm policies which are expected to govern discussions to take place at the United Nations Conference in San Francisco in April.

The State Department expects to get firm commitment on the following eight points:

1. Endorsement of free enterprise. Eliminate state trading.
2. Elimination of discriminatory laws of all countries against foreign corporations.
3. Eliminate wartime trade restrictions.
4. Eliminate other trade barriers.
5. Recognize the rights of labor.
6. Adoption of the Bretton Woods Agreement.
7. Adoption of various commodity agreements.
8. Elimination of cartels.

The first point is rather nebulous, since there are as many definitions of free enterprise as there are supporters and opponents of the concept. Those who oppose the idea propose the abolition of free enterprise and the substitution of state socialism for it.

With variations, those who favor freedom of enterprise fall into the groups of thinking generally.

Some Americans believe in freedom

of enterprise as far as it is permitted "under regulation" devised by regulatory bodies which are a "little to the left of center." This kind of a society says that private enterprise should provide all the jobs it can and then government should provide "full employment" through a three-headed policy of either spending, lending, or having the government enter the field of business directly. The danger of this thinking is that it leans toward state socialism.

The other "free-enterprisers" in America who subscribe to the belief that only a man's ambition, determination and abilities limit his progress, and consequent belief that self-reliance is the trait which guarantees a man a living, want a minimum of government regulation and subsidy. This group wants government out of business, to make no loans, and to leave social security, medical care, education to the industry and forethought of the individual. The danger of this thinking carried too far is unemployment which carries with it the seeds of regimented economy, in reaction to a breaking down of free-enterprise machinery during depres-

sion. There seems to be no large political group which has devised a middle course for America to avoid the two roads to totalitarianism.

What does free enterprise mean to a Latin American or a Russian, if it is to be believed that the United States is going to insist upon the endorsement of these ideas?

Latin American countries are largely agricultural with the masses of the people separated by almost unfathomable social, educational and economic gulfs between the landed proprietors and industrialists and their peon workers. Besides, cartels have long been sanctioned by many of the countries of Central and South America, and all Latin American countries follow the codified continental system of laws patterned after Roman Jurisprudence which as different as day is to night when compared to the Anglo-American system of laws. By and large industry is controlled, not regulated, in the countries which are for the most part 50 to 75 years behind the United States industrially.

The idea of Russia agreeing to

ROER RIVER DAM: This is how Dam No. 5 across the Roer River in Germany appeared when it was captured by troops of the U. S. Ninth Infantry Division First Army, on Feb. 4. Bomb and shell craters are at the foot of the dam.



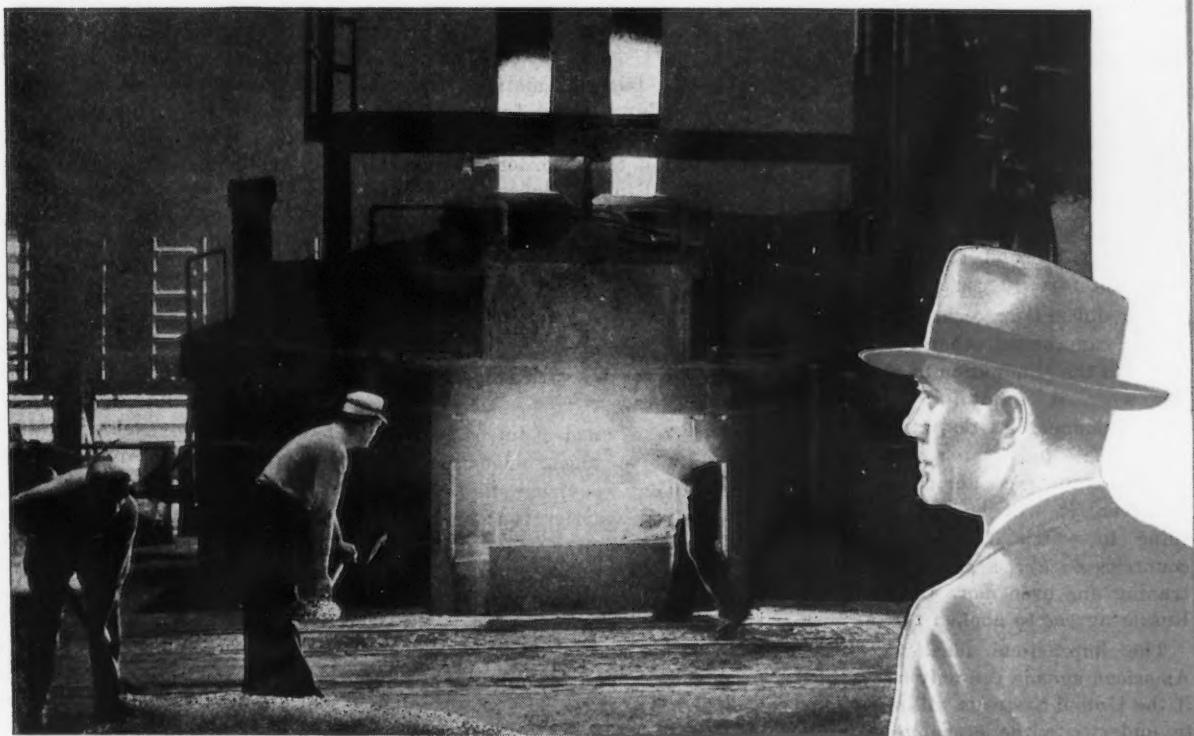
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REFRACTOR

SIC



Preferred by many operators for electric furnace hearth maintenance, Syndolag is a rice-size clinkered dolomite with chemical and mineralogical properties similar to those of Magnefer.

## "FRIEND IN NEED IS A FRIEND IN DEED"

THE thing that differentiates the Basic Refractories representative from lots of the other men who call on you is that he knows something about your industry and its refractory problems, as well as the products he's selling.

He is more than a salesman, he's a Refractories Engineer. He's a man who has actually made steel. The open hearth and the electric furnace are familiar production tools to him, because he has worked with them "on your side of the fence".

When he talks to you about basic refractories, he can give you facts, backed

up by personal experience. What's more, you are urged to take advantage of his practical knowledge of methods of application—for building new hearths, making major repairs, or controlling heat-to-heat maintenance. It's his job to see that Basic Refractories products give excellent service in your furnace, and to help you in any other way he can.

There's many a time that a Basic Refractories man has taken off his coat and put on the overalls to help a customer in a tough spot. So think of your Basic Sales Engineer as your friend in need, who is a friend in deed, too.



**BASIC REFRactories, INCORPORATED** 845 HANNA BUILDING  
Cleveland 15, Ohio

adopt free enterprise as an economic goal is too ridiculous to even discuss. The only conceivable thing that the Russians could agree to across the peace table with respect to freedom of enterprise is to tolerate it in other countries. The only thing Latin Americans could agree to would be to refrain from becoming socialist or fascist states, and to maintain the capitalist form of society.

It is difficult to see how the United States can compel other countries to agree to the elimination of state trading when it maintains the United States Commercial Co., and has welcomed the purchasing missions of various countries during the war. However, it will be an interesting thing to watch if Latin American countries do agree to eliminate state trading and even more interesting if Russia agrees to abolish the Amtorg.

The impractical idealism of the American agenda can only be justified if the United States is willing to offer to underwrite the economic security of the world. This is exemplified by the second point—the elimination of discriminatory laws against foreign corporations. In turn, the United States must offer a similar concession and give something to overcome the

natural flavoring of domestic companies by all nations.

**S**OME Latin American nations have laws which forbid foreign corporations from engaging in business within their borders if they do not hire all native labor; other laws require the ownership of 51 per cent of the stock by the citizens of the country where the foreign corporation does business. The American market has been the best in the world and has been protected by tariffs and fairly strict laws with respect to foreign corporations.

While the third point should not run into too much opposition, the fourth point requiring the elimination of trade barriers promises to be thorny. No country will be willing to lower tariffs, unless other countries do. British political observers here say that Britain might agree to do away with imperial preferences upon proper assurance and might agree to abolish the sterling bloc if she could get assurance of getting enough dollars to trade with America. On the other hand, business groups in the United States will want a great deal of assurance on the part of all governments concerned, and will generally oppose "free trade."

To recognize the rights of labor, the fifth point, is as nebulous and subject to interpretation as the first one and apparently does not mean much. The sixth point, the adoption of the Bretton Woods conference agreement on stabilizing world currency has not been approved by Congress.

The seventh and eighth points will involve much controversy, it is predicted. The State Department evidently wants the conference to agree to approve various commodity agreements (providing for governmentally supervised cartels) in agricultural products, oil, rubber and tin and perhaps others, in exchange for agreements that Latin American countries will outlaw cartels.

What promises of financial assistance will have to be given to get these countries to outlaw cartels is unknown, but it will have to be substantial. British political observers here say that Britain in the big conference will not make any such promise and will keep her cartels for all time, unless she finds by experience that she can trade and compete with the rest of the world without using such forms of organization.

## THE BULL OF THE WOODS

BY J. R. WILLIAMS



## Castings Procedure Simplified by OPA

Washington

• • • OPA has announced a simplification of the price adjustment provision in MPR 125 governing maximum prices of nonferrous castings. The simplification eliminates the filing of two of the four forms previously required by OPA and reduces the amount of information that must be submitted on the remaining two forms, one of which is required with each application for price adjustment.

The forms that have been eliminated are the so-called customer's forms. These forms were previously filed with OPA by customers of the applicant and were required in order to determine if the applicant's production was essential to the war effort or if his adjusted price would be as low as or lower than that of alternative sources of supply. The requirement that one or the other of these conditions be met is eliminated and adjustments may now be issued if the applicant's production aids directly in the war program or is not inconsistent with the uses of plant, materials and manpower permitted by the authorities charged with the prosecution of the war.

## HOW ARE SUBSTANTIAL SAVINGS ACHIEVED BY GRINDING WITH A CRUSH DRESSED WHEEL?

### IS GRINDING TIME REDUCED?

Yes! On the Sheffield Precision Thread and Form Grinder with a crush dressed multi-ribbed wheel, grinding time is often reduced as much as two-thirds.

### DOES CRUSH DRESSING PROVIDE A BETTER CUTTING SURFACE?

Yes! Crush dressing removes whole grains from the wheel leaving a multitude of effective cutting edges whereas diamond dressing cuts across the grains leaving flats which do not cut but do increase generation of heat.

### IS CRUSHED WHEEL DRESSING PAST?

A full form can be crushed into a wheel on the Sheffield Precision Thread and Form Grinder by the special crushing device, in a fraction of the time required by conventional dressing methods. Intricate profiles requiring hours by diamond dressing, can be crushed into a wheel in a few minutes. After the original crushing of a wheel, resurfacing or redressing take only a few seconds.

### DOES CRUSH DRESSING REDUCE DRESSING TOOL COSTS?

The Sheffield Corporation introduced and pioneered crush dressing in this country and found from several years' experience that wheel dressing costs by this method on many jobs are considerably less than for

diamond dressing. Many dressings are possible with the crusher roll—and a large quantity of parts can be produced from one wheel dressing.

### CAN CRUSH DRESSING BE USED ON A SURFACE GRINDER?

Fixtures used in mounting crusher rolls on standard surface grinders for crushing wheels to produce flat profiled work, have been developed and pioneered by the Sheffield Corporation. Sheffield engineered surface grinders incorporating crush dressing equipment as an integral part are available.

### WHERE CAN CRUSHER ROLLS BE OBTAINED?

Stocks of crusher rolls for producing threads in standard pitches are maintained in stock for immediate delivery. Rolls for coarser pitch threads and for all other types of forms can be obtained from Sheffield.

### WHERE CAN FULL INFORMATION BE OBTAINED?

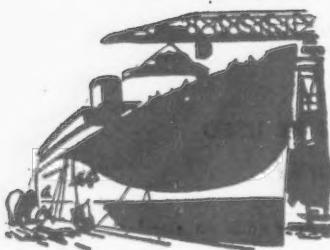
Details on crusher rolls for immediate delivery, surface grinder crusher roll mountings, the Precision Thread and Form Grinder for producing circular formed and threaded parts and the Micro-Form Grinder for producing crusher rolls and other profiles will gladly be sent by the Sheffield Corporation, Dayton 1, Ohio, U. S. A.

Advertisement by the Sheffield Corporation

# West Coast . . .

OSGOOD MURDOCK

- Six principal aircraft makers planning with AFL and CIO officials to enter voluntary umpire agreements, replacing WLB in settling job classification and wage stabilization difficulties.



LOS ANGELES — Six principal southern California airframe manufacturers, Douglas, Lockheed, North American, Consolidated-Vultee, Ryan and Northrup, functioning as the Southern California Aircraft Industry and represented by E. D. Starkweather, have signed a letter of tentative intent with Roy M. Brown, international vice president of AFL's IAM and with Charles W. Steese, international representative of CIO's UAW, leading toward the establishment of a voluntary umpire system to operate under labor's and management's exclusive direction in establishing uniform aircraft wage structures. It is expected to eliminate endless bickering and dissatisfaction over grade classifications and pay differentials.

It is hoped that the new plan will supplant the present control over the industry's labor relations by the War Labor Board so that grievances, differences and misunderstandings may be handled through labor-management submission to a mutually selected umpire. April 1 is set as the date when the system may become operative. Meanwhile the West Coast Aircraft Committee of which Earl J. Miller is chairman, continues to handle job descriptions and classifications. Approximately 200,000 workers are involved. Such questions as who will pay the umpire and the types of cases to be handled are still to be definitely

agreed upon. Although Northrup joins in the voluntary plan, it is not organized by either CIO or AFL.

WHEN Bethlehem Steel Co. announced purchase of the Petroleum Equipment Co. of Los Angeles a week or two ago, eyebrows were raised and heads were nodding in the assumption that this major company's interest in pipe, tubing, oil field casing and general drilling equipment may be expected to increase. The Petroleum Equipment Co. was established in 1922 by George W. Schweinhard and William Read and now has field offices at oilfield centers throughout California. Principal warehouse and general office are at 2800 South Alameda St., Vernon. H. H. Fuller, Pacific Coast manager for Bethlehem, will be vice-president and G. W. Schweinhard, surviving founder of the original company is vice-president and general manager. R. Somers is assistant treasurer and assistant secretary.

\* \* \*

Recent tighter restrictions on seamless tubing are seriously affecting petroleum operations and development in the Pacific Southwest. This area normally consumes over 25 per cent of the national output of seamless, and stocks are so low that the industry unsuccessfully attempted two months ago to have mill stocks re-established on the West Coast. Continuous weld pipe is being used in place of seamless in sizes smaller than two inches and the casing problem becomes serious. Mills are quoting third and fourth quarter delivery on direct shipments and warehouses not earlier than June. Line pipe and casing are the toughest problems.

\* \* \*

Wood screws are being produced for the first time west of the Mississippi River by the Apco Manufacturing Co., formerly the Aircraft Parts Co. of Santa Monica. W. A. De Vellier & Associates of New York have licensed this firm, headed by W. Thomas Davis and Ted Falk, to produce rolled thread screws, and equipment is being installed to turn out 5000 gross per 10-hr. day within the next three months. Production will eventually include a full line of screws and bolts produced by the cold forging of blanks and the lateral extrusion of threads.

Only cold rolled strip facilities of Illinois are operated by the California Cold Rolled Steel Corp. at Los Angeles and recently three tandem mill equipment has been installed to roll strip from 0.018 up to 0.125 in. and in widths from  $\frac{1}{8}$  in. to 12 in., with tolerance up to 0.0002 when required. Capacity of the plant would be 3,000,000 pounds per month if skilled labor were available. The bell-type furnaces, each operating four bases, supply bright annealing facilities for all stock and there is pickling.

Fred L. MacQuarrie, veteran steel mill engineer and former consultant with the A. M. Byers organization, president, James E. Lewis is vice-president and general manager, H. MacQuarrie is vice-president and general superintendent and C. L. Smith is secretary-treasurer. The firm was established in 1939 at Maywood and moved into its present new plant in 1941 where four and a half acres of a welded steel building 55 by 250 ft. provide ample facilities for present operation and future expansion.

\* \* \*

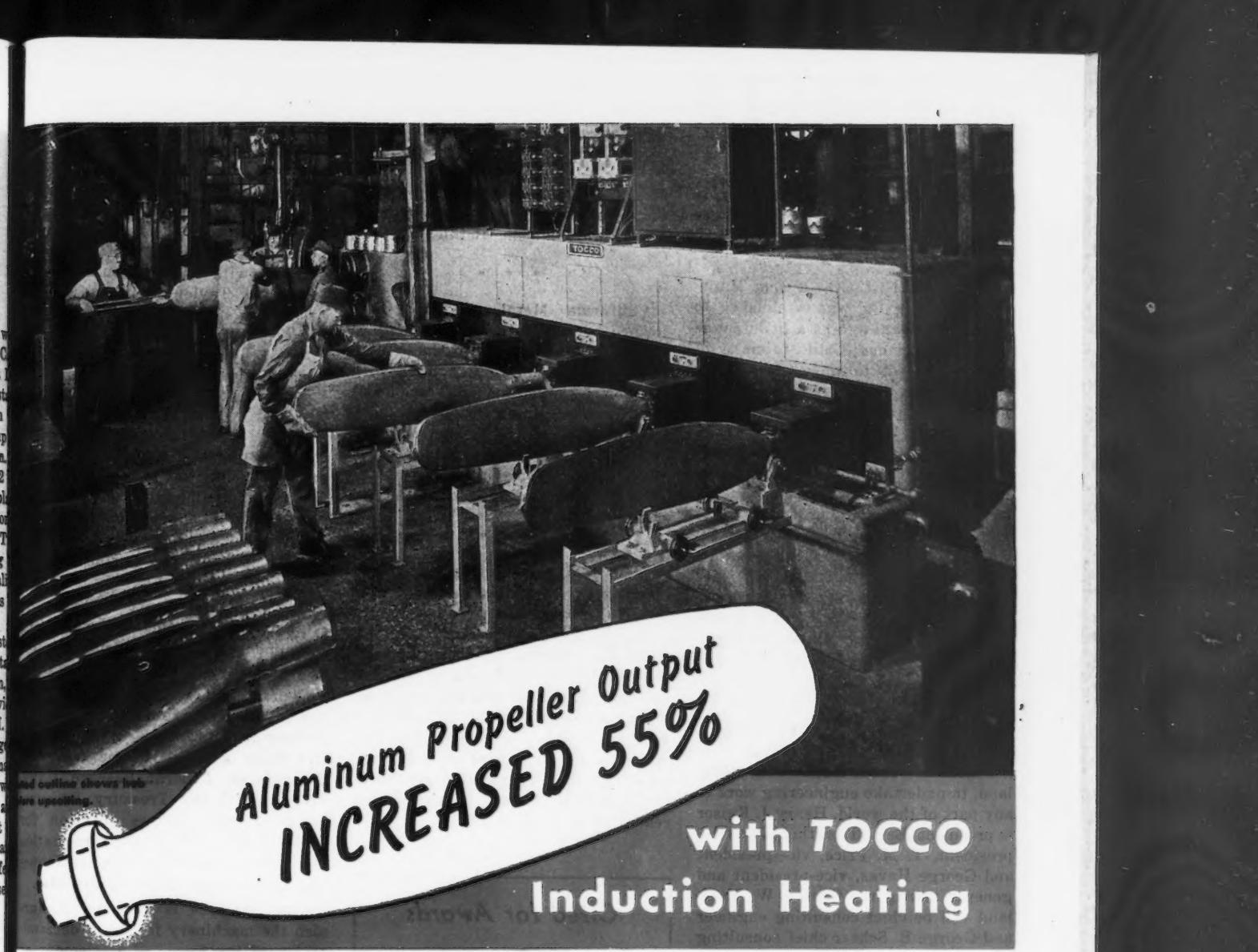
Additional contracts for a total of \$434,000,000 have been awarded Douglas, Lockheed and North American aircraft plants for bombers and fighter planes. Douglas and Lockheed will make more B-17's, Lockheed fast fighter also and North American the P-51 fighter.

\* \* \*

Consolidated Steel Corp. Ltd. has reported a net profit of \$3,515,543 for its last fiscal year after preferred dividends. This is equal to \$13.55 a share on 241,617 shares of common stock outstanding and compares with \$10.50 a share for the preceding year. The year's production aggregate is \$379,039,030, an increase of almost \$83,000,000 over 1943. Bank loans have been completely repaid and current assets are \$38,558,408 with a surplus of \$4,337,683.

\* \* \*

Now it can be told that Northrup P-61 Black Widow night fighter carries eight powerful stingers. Mounted in the belly of the plane are four 20 mm. cannon. In a power turn just above and behind the pilot are four more 0.50 cal. machine guns. The turret can be power-driven to fire



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fire upsetting

Aluminum Propeller Output  
**INCREASED 55%**

with **TOCCO**  
**Induction Heating**

A LARGE manufacturer of automotive and aircraft parts reports these improvements in the heating for upsetting of aluminum propeller hub flanges for many of our fighters and bombers, including the B-29 Superfortress:

The former batch heating method—hot, dirty, cumbersome and non-uniform—required 2½ hours to heat the hubs. Total output averaged 45 per hour.

The 5-station TOCCO Induction Heating machine shown above—compact, clean, cool

and accurate—heats 9" of the 5¼" diameter hubs to 800-850° F. uniformly throughout both length and cross-section. Every 47½ seconds, a prop is ready for the upsetter which is shown at the left of the TOCCO machine. Output of this one TOCCO unit averages 70 per hour . . . 55% faster than former method.

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**TOCCO**

**INDUCTION**  
**HARDENING . . BRAZING**  
**ANNEALING . . HEATING**

## WEST COAST

the rear, with automatic cut-offs to miss the twin tail fins. All guns are fired by pressing a button.

\* \* \*

**S**AN FRANCISCO—Rheem Manufacturing Co. was established 10 or 15 years ago as a little enterprise at Richmond, Calif., to make oil drums adjacent to the Standard Oil refinery. Its annual report to be released next month will show total sales for 1944 of \$76,000,000 with 19 plants in the United States, one planned in Brazil and three operating in Australia. Recent major ordnance contracts include a big operation at Las Vegas in the Basic Magnesium buildings and raise current production to approximately \$12,000,000 per month of which over \$2,000,000 are drums. At the Las Vegas plant rocket and 81mm. mortar ammunition are being produced and 105mm. shells are being forged.

\* \* \*

Kaiser Engineers, Inc., has been organized as a permanent group with headquarters in the Kaiser Bldg., Oakland, to undertake engineering work in any part of the world. Henry J. Kaiser is president, E. E. Trefethen, Jr., vice-president, T. M. Price, vice-president and George Havas, vice-president and general manager. George W. Vreeland will be chief consulting engineer and George B. Scheer chief consulting electrical engineer. The organization aims to function in connection with civil, hydraulic, structural, mechanical, electrical, architectural and metallurgical projects.

\* \* \*

Edward L. Soulé, president of the Soulé Steel Co., operating as a major fabricator through the entire West Coast area, is chairman of a newly formed iron and steel section of the industrial development committee of the San Francisco Chamber of Commerce.

Other members of the committee include Dr. Henry F. Grady, president of the Chamber and of the American President Lines, Ltd.; Wakefield Baker, Baker & Hamilton; F. J. Chittenden, Walworth California Co.; Charles Daiss, Joshua Hendy Iron Works; F. B. DeLong, Columbia Steel Co.; Joseph Eastwood, American Forge Co.; F. T. Letchfield, Wells Fargo Bank & Trust Co.; Charles J. P. Hoehn, Enterprise Engine & Foundry Co.; T. A. Mass, Bothin Real Estate Co.; Charles E. Moore, Joshua Hendy Iron Works; William Moller, Rheem Manufacturing Co.; A. B. Ordway, Iron & Steel Division, Kaiser Co.; R. D. Plageman, Western Pipe & Steel

Co.; S. C. Pohlmann, California Wire Cloth Co. and Howard Schirmer, steel fabricating division, Bethlehem Steel Co.

\* \* \*

California Metals Co. has been formed by Henry G. and Marshall A. Shapiro to handle steel products, non-ferrous metals and mill supplies, with main office at Oakland and branches at San Francisco, and Pittsburg, Calif. Organizers are also the active operators of California Scrap Iron Corp. which will continue its operations in iron and steel scrap and associated commodities.

\* \* \*

CIO's total membership in California was grossly underestimated in a recent reference in these columns. State Executive Secretary Mervyn Rathborne informs us that the total membership in California is now approximately 250,000 and that the total state membership in the United Steel Workers division is 30,000. The former estimate was based on the circulation of the organization's publication, the *Labor Herald*, which does not reach every member.

### Cited for Awards

\* \* \* The following companies have received Army-Navy "E" awards for outstanding war production:

Greenfield Tap & Die Corp., Greenfield, Mass. (fourth star)  
U. S. Machine Corp., Lebanon, Ind. (third star)  
Edwards & Co., Norwalk, Conn. (fourth star)  
Federal Screw Works, Detroit, Mich. (fifth star)  
Cochrane Corp., Philadelphia, Pa. (second star)  
Treadwell Engineering Co., Easton, Pa. (fifth star)  
Chase Brass & Copper Co., Waterbury, Conn. (fifth star)  
Connors Steel Co., Birmingham, Ala.  
Mercury Mfg. Co., Chicago.  
American Machine & Metals, Inc., East Moline, Ill. (fourth star)  
Les Mfg. Co., Waterbury, Conn. (first star)  
Pratt & Whitney, Division Niles-Bement-Pond Co., West Hartford, Conn. (fourth star)  
Alton Box Board Co., Alton, Ill.  
Bendix Aviation Corp., Pacific Division, North Hollywood, Cal.  
Dewey-Shepard Boiler Co., Inc., Peru, Ind.  
Gar Wood Industries, Inc., Boat Division, Marysville, Mich.  
Hi-Voltage Equipment Co., Cleveland.  
Johnston Tin Foil & Metal Co., St. Louis.  
Johnston Tin Foil & Metal Co., South Alton, Mo.  
Leland Electric Co., North Main Street & Webster Street Plants, Dayton, Ohio.  
Master Tire & Rubber Corp., Findlay, Ohio.  
Henry Owens & Co., Providence, R. I.  
Pacific Car & Foundry Co., Billings, Mont.  
Royal Wood Products Mfg. Co., Inc., Brooklyn, N. Y.  
Slaymaker Lock Co., Lancaster, Pa.  
Standard Steel Spring Co., New Castle Plant, New Castle, Pa.  
Standard Tool & Mfg. Co., Arlington, N. J.  
Underwood Elliott Fisher Co., Hartford, Conn.

Thomas H. Kepner has been appointed procurement supervisor of Westinghouse Electric & Mfg. Co.'s plant at Emeryville, Calif. Long associated with Westinghouse, Kepner joined the Taylor Winfield Corp., as production manager in 1942 and returned to Westinghouse as staff supervisor of the manufacturing and repair department in 1943.

\* \* \*

\* \* \* Termination coordination committees under the provisions of the Contract Settlement Act of 1944 have been set up at San Francisco, Seattle and Los Angeles and, it is hoped, will simplify procedures for contract termination in this area.

Portland is to be serviced by a sub-committee of the Seattle branch and recommendations have been made for a similar committee in San Diego.

Overall general committees are composed of representatives of the procurement branches of the Army and Navy as well as the Maritime Commission, Federal Reserve Bank, SWPC, RFC and Treasury Procurement. Sub-committees function for audit coordination, pre-termination and advance planning, interim financing, training and property disposal.

Chief purpose is designed to furnish the machinery for rapid determination of the terms of settlement as contracts are terminated, and to permit rapid changeover to production of other war goods.

Geographical scope of the committees is fixed by the nature of the production in each area. The San Francisco committee is headed by a Navy officer because of the dominant maritime industries, while in Los Angeles the chairman is an Army officer, reflecting the volume of buying in that area.

Number of volume of contract terminations have increased in recent weeks and these subcommittees are expected to swing into action at first notification of a contract termination to determine the need—or lack of it—for a substitution or replacement contract to settle the financial terms (subject to review by no other agency except for reasons of fraud) and to coordinate the activity of the individual plant with that of the region at large from the point of view of both production and man-power.

Committees may be contacted through procurement branches of the military or war agencies in their respective districts.

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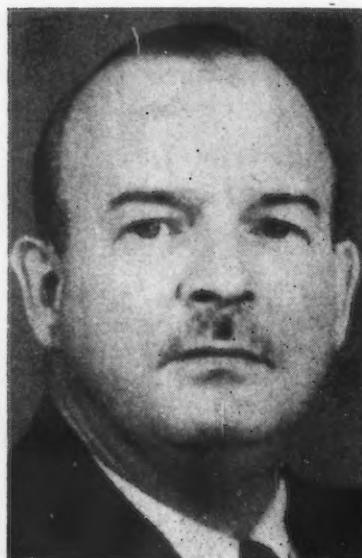


JOHN C. COTNER, vice-president  
Geroter May Corp.

## PERSONALS

• Ray P. Tennes has been elected president, Shafer Bearing Corp., Chicago; J. F. Ditzell has been elected executive vice-president and general manager; M. J. Tennes, Jr., vice-president; A. H. Williams, vice-president in charge of engineering; I. B. Lipson, secretary; A. L. Gray, assistant secretary and treasurer and E. H. Ferguson, assistant treasurer.

• Harris McIntosh has been elected vice-president in charge of production and engineering, and director of the Toledo Scale Co., Toledo. Mr. McIntosh was assistant to the president and director of management control of the Lockheed Aircraft Corp. prior to his present position.



ROBERT S. LYNCH, general superintendent, Atlantic Steel Co.

• Robert S. Lynch, formerly with Republic Steel Corp., has been appointed general superintendent of Atlantic Steel Co., Atlanta. Prior to his appointment as general superintendent of Republic's Canton-Massillon Enduro Division in 1939, Mr. Lynch was affiliated with the U. S. Steel Corp. and the United Alloy Steel Corp. Robert M. Lang has been appointed superintendent of blooming and billet mills, in addition to his previous duties as superintendent of rod and bar mills, and Joseph H. Girdler has been named superintendent of the Open Hearth Department.

• John D. Homan of Tampa, Fla., has been appointed regional sales representative of the Stearns Magnetic Mfg. Co., Milwaukee.

• George C. McMullen has been appointed assistant to the president, and vice-president in charge of product research and development, Tyson Bearing Corp., Massillon, Ohio. Harry L. Vines, former western manager for R. G. Le Tourneau, Inc., has been named director of sales.

• D. J. Richards has been elected vice-president, sales, for E. F. Houghton & Co., Philadelphia. Mr. Richards has been connected with the sales department since 1917, and since 1943 has been assistant director of sales.

• H. V. Ennis has been appointed assistant to vice-president, American Car & Foundry Co., New York. Mr. Ennis will assist J. A. V. Scheckenbach, vice-president, manufacturing.

• John H. Lease has joined the staff of the Rees Machinery Co., Pittsburgh, to augment service to the firm's customers in the tri-state area.

• Frank T. Bumbaugh has been appointed manager of sales, Alloy Division, Carnegie-Illinois Steel Corp., Pittsburgh, succeeding the late Frank L. Gibbons, whose assistant he had been for the past three years. Mr. Bumbaugh joined the organization in 1926. He served as metallurgical engineer in the bar, semi-finished and alloy products division in Pittsburgh and later was transferred to Chicago in 1942 as assistant manager of alloy sales.

FRANK T. BUMBAUGH, manager of sales, Alloy Division, Carnegie-Illinois Steel Corp.



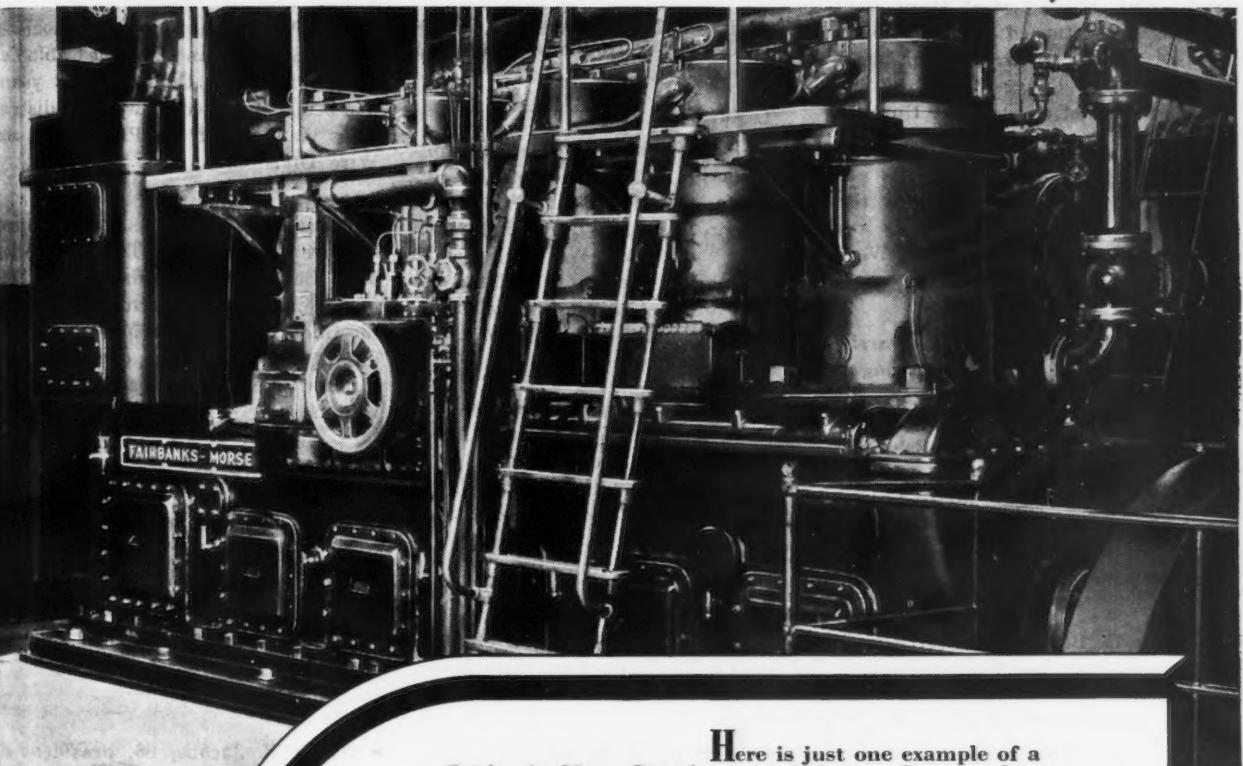
A name worth remembering

# FAIRBANKS-MORSE



Practically every industrial equipment problem that is submitted to Fairbanks-Morse is similar to problems we have previously solved at some time during our 115 years in business. If you have a problem, we invite you to draw on our broad, successful experience in applying Diesel engines, generators, motors, pumps, or scales to the needs of industry.

*A. H. Morse Jr.*  
General Sales Manager



Here is just one example of a Fairbanks-Morse Diesel serving industry. Connected to a Fairbanks-Morse Generator, it furnishes power for the Cambridge Glass Company. During the first twelve months after installation this Diesel recorded operating savings of \$12,873.66 in comparison to the company's previous sources of power.



## DIESELS

Fairbanks, Morse & Co., Chicago 5, Illinois

Diesel Locomotives • Diesel Engines • Generators  
Motors • Pumps • Scales • Magnets • Stokers  
Railroad Motor Cars and Standpipes • Farm Equipment

BUY MORE WAR BONDS  
SPEED V-DAY

PERSONALS

• Carroll B. Mershon has been appointed assistant to the president, Pennsylvania Industrial Engineers, Pittsburgh. Mr. Mershon was previously manager of industrial sales for the Manufacturers Light & Heat Co.

• W. J. Ross, of the Hyman-Michaels Co., Chicago, Ill., has been elected first vice-president. William Rosenthal, H. L. Purdy and W. A. Newman have been elected vice-presidents and J. E. Michaels, secretary-treasurer.

• A. S. Vandervoort, Jr., has been made sales manager, Mid-Continent District, Pittsburgh Steel Co., Pittsburgh, with headquarters at Houston. S. E. Elder has been appointed assistant sales manager of the same district with headquarters at Tulsa. Paul R. King has returned to the company as sales representative on all products, at Tulsa. George W. Novak has been made chief engineer at Houston of the Mid-Continent District.

• John P. Johnston has joined the Weatherhead Co., Cleveland, as refrigeration engineer for the West Coast office in Glendale, Calif.

• H. M. Sliter and R. M. Darrin have been appointed district manager and assistant district manager, respectively, of the Central Station Division, General Electric Co., Schenectady. Horace Zimmer has been appointed district manager of the Industrial Division, in addition to his present position of district manager, Transportation Division.

• Charles H. Brown, until recently a member of the purchasing department, Lukens Steel Co., Coatesville, Pa., has retired after 49 years of service with the company.

• E. E. Ellwood has been appointed assistant district sales manager of the St. Louis district, the Youngstown Sheet & Tube Co., Youngstown, Ohio. J. P. Feagley has been named assistant district sales manager of the New York district.

• S. S. Kahn has been appointed sales and advertising manager of the Parker-Kalon Corp., New York, to succeed the late Charles S. Trott.

• Frank Roby has rejoined the Industrial Controller Division, Square D Co., Milwaukee, as sales manager.



L. G. BURWINKEL, assistant to vice-president, Westinghouse Electric & Mfg. Co.

• L. G. Burwinkel has been appointed assistant to vice-president, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. Mr. Burwinkel entered the employ of Westinghouse in 1924. In 1940 he was appointed assistant to the Central District manager, the position he held prior to his recent appointment.

• Thomas W. Flood has been elected a vice-president of The Electric Auto-Lite Co., Toledo, in charge of original equipment sales in the company's 22 plants throughout the United States and Canada.

• Dr. Donald Price, formerly associated with the Interchemical Corp., has been appointed technical director of Oakite Products, Inc., New York.

• Frederick W. Hainer, former chief engineer of the Cleaver-Brooks Co., Milwaukee, has been elected vice-president in charge of sales, production and management problems.

• Allen Robinson has been appointed head electrical engineer of American Steel & Wire Co., Cleveland, and Clare L. Becker has been named assistant electrical engineer.

• James R. Weaver, who has been in charge of the Naval Ordnance plant at Center Line, Mich., operated by Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pa., has been appointed works manager of the Westinghouse plant at East Springfield, Mass.

• J. J. Walsh, who has been associated with the American Chain & Cable Co., Inc., Bridgeport, Conn., for 22 years, has been appointed New York district sales manager of the Page Steel and Wire Division.

• Karl B. Thews has been named sales manager of the Titanium Alloy Mfg. Co., Niagara Falls, N. Y. Formerly chief development engineer in the Chemical Division, Mr. Thews will direct metallurgical, chemical and ceramic sales, as well as all field development.

• Sidney Kelter, formerly district price specialist of the OPA, has joined the St. Louis office of Hyman-Michaels Co., Chicago.

• W. H. Webb has been appointed assistant sales manager of Detrex Corp., Detroit.

## OBITUARY...

• C. K. Everitt, prominent English metallurgist and pioneer in the development of the electric arc furnace, died February 5. Mr. Everitt joined Edgar Allen & Co. in 1882, subsequently becoming assistant manager and manager of the Steel Department. He was made a director of the company in 1908 and chairman of the board in 1930.

• Charles G. Adams, operations manager of Basic Refractories, Inc., Cleveland, died suddenly February 12. Mr. Adams was 43 years old.

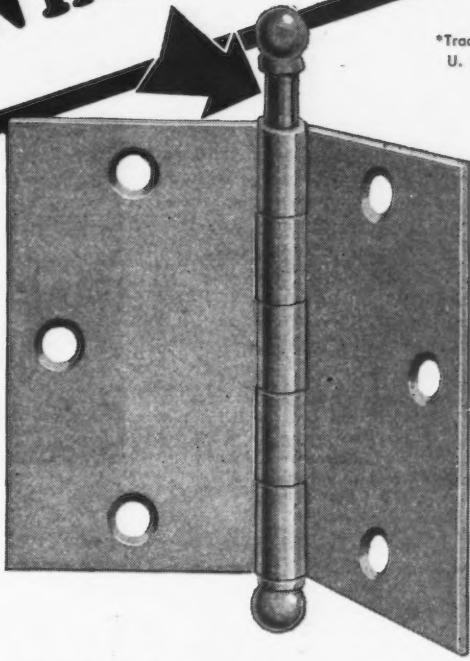
• Harry E. Jacobs, 66, president of the Jacobs Bros. White Metals Co. and a partner in the Jacobs Metals Co., Milwaukee, died suddenly February 10.

• Frank D. Egan, 61, superintendent of the Bethlehem Steel Co. electrical department at Lackawanna for 20 years prior to his retirement two years ago, died February 17.

• Charles F. Norton, 63, one of the founders of the Howell Electric Motor Co., Howell, Mich., and vice-president and general manager until 1933 when he became sales manager of the Louis Allis Co., Milwaukee, died February 11.

**THERE'S A BIG DIFFERENCE  
IN SIZE . . . BUT BOTH ARE  
CONTINENTAL\* WIRE**

\*Trademark registered  
U. S. Patent Office



### **THE WIRE OF A THOUSAND USES**

The versatility of Continental wire is apparent when you look at the illustrations above. There is not only a big difference in the size of the wire in the match book and the pin in the door hinge, but there is a big difference in the temper, analysis, and finish. Continental wire for each of these applications is made especially to meet the individual requirements.

Continental specializes in producing wire in a vast variety of shapes, tempers, analyses, and coatings to fit the particular specifications of hundreds of products. You are invited to take advantage of this service. Write or wire today for complete information.



**CONTINENTAL**  
**STEEL CORPORATION**  
GENERAL OFFICES • KOKOMO, INDIANA

**PRODUCERS OF:**

MANUFACTURER'S WIRE: Bright, Annealed, Galvanized, Coppered, Tinned, Liquor Finished, Lead Coated, Special wire, etc. Also Chain Link Fence, Nails, etc.

STEEL SHEETS: Black, Galvanized, Hot Rolled Annealed, Hot Rolled Pickled, Long Terne, Copperior, Lead-Sealed, Galvannealed, Super-Metal, etc.

THE SUPERIOR SHEET STEEL COMPANY, DIVISION • CANTON, OHIO

# Dear Editor:

## VALLEY FORGE

Sir:

This Commission is considering restoration of the original Mt. Joy Forge or Valley Forge, owned and operated by Potts and Dewees up to September, 1777, when it was burned by the British. Can you direct us to written or published data on the character of the housing for the original forge?

Our investigation discloses that this little plant was a bloomery forge and used broken up furnace cinders, fluxed with scraps of pig iron, which were fashioned into blooms and afterwards hammered into nails, horse-shoes and tools. Because of the poor quality of iron ore in adjacent hills, pig iron was secured from Warwick Furnace and even from Andover Furnace in New Jersey. From our study it would seem that water was sluiced from Valley Creek to an overshot water wheel, on the axle of which was a wiper-wheel with cogs to operate a trip or tilt hammer. This probably consisted of a heavy head of wrought iron mounted on a beam which appears to be ash or oak. The anvil rests on a solid wood foundation in a shallow pit where the hammerman manipulated the hot mass under the blows of the hammer in "shingling" or squaring it up into a bloom. A heating furnace was likely used to soften the iron again if it chilled too hard.

GILBERT S. JONES,  
Executive Secretary

Commonwealth of Pennsylvania,  
Valley Forge Park Commission,  
Valley Forge, Pa.

Sketches of equipment used during that period have been sent, and information of general interest on this forge is contained in the "History of the Manufacture of Iron in all Ages," by James M. Swank, published in 1892. Perhaps our readers may be able to recommend other sources of information.—Ed.

## DEEP DRAWING CANS

Sir:

Can you refer us to published information on deep drawing cans? We seem to recall an article on the drawing of beer cans from sheet steel, instead of fabricating them by conventional methods.

D. A. COTTON,  
Process Laboratory

General Motors Corp.,  
Delco-Remy Division,  
Anderson, Ind.

This type of can is produced by the Crown Can Co., Philadelphia. They have released very little information on actual drawing practice.—Ed.

## LEADED STEELS

Sir:

We hear interesting claims as to the machinability of leaded steels, and

a good deal of leaded mild steel is used in this country. I should like to know whether it is true that America has dropped this product? Has progress been made in the production of leaded alloy or stainless steels?

C. CYKES

Brown-Firth Research Laboratories,  
Princess St.,  
Sheffield 4, England

Since the war started, leaded steels have practically disappeared from the U. S. market. Only one mill is turning out quantities, primarily for British accounts and for several domestic users. It is generally believed that leaded steels will not regain significance in this country, at least not until industry returns to a buyers' market. Then if they are priced commensurate with their costs, users may not find them economical.—Ed.

## BLAST FURNACE



Sir:

In the article "Miniature Smelting," from the Feb. 1 issue, there is a description of what is claimed to be the smallest blast furnace in the world. A smaller furnace was built by Louis Johnson and me for Newtown High School at Elmhurst, N. Y., in 1934-5, which can produce molten pig iron from iron ore. The height from bottom of hearth to top of stack is 30 in.; throat, 8 in. dia.; bosh, 12 in. dia.; and hearth, 7 in. dia. We copied the structural features of full size furnaces, even to the columns supporting the stack and simulated plate work on the stack.

The furnace was operated on several occasions, using ore from the re-opened magnetite mines at Ringwood, N. J., pea size domestic coke and pebble lime. Blast was supplied from a positive pressure blower. For each four hours' operation it was possible to tap a small amount of iron once, and slag two or three times. However, the size of the plant and absence of a preheated blast fostered chilling of iron around the tuyeres and caused them to become obstructed shortly after molten iron began to reach the hearth level. Only a limited amount of iron could be obtained before the

blast was so reduced that the furnace lost temperature.

C. D. PREUSCH  
661 Lincoln Ave.,  
Orange, N. J.

## SCRAP SEGREGATION

Sir:

Segregation of alloy scrap is a complex problem here, particularly the handling of battlefield scrap and other war production surpluses. I have been wondering how your major steel merchants are tackling the problem of sorting these materials.

W. HALL

Thos. W. Ward, Ltd.,  
90 Fenchurch St.,  
London, E. C. 3, England

Some effort has been made by scrap producers here to segregate scrap, and in plants generating lots of it carloads of specified analysis go out to the mills for remelting. Relatively little iron and steel battlefield scrap has come into this country for segregation and at the present time its importation is negligible and segregation is by visual inspection. Our surplus war materials scrap has not reached the market in large quantities and its disposition is still a problem to government agencies and to the scrap trade.—Ed.

## DRILL PROTECTION

Sir:

In the Jan. 18 News Front it is said that drill breakage has been reduced by a new fixture, a torque coupling which disengages the drill at a predetermined point in ft.-lb., then re-assumes the load when the driving torque returns to normal. May we have further information?

MARGARET MANN,  
Librarian

Canadian Car & Foundry Co., Ltd.,  
Ft. William, Ont., Canada

The article describing this development appears on p. 68 of that issue, and we are mailing a tear sheet.—Ed.

## TOOL STEEL DIRECTORY

Sir:

We are attaching check for \$25.00. Please send us fifty copies of the new edition Tool Steel Directory.

W. A. ELLERBROCK,  
Steel & Machine Tool Sales Co.,  
Houston 1, Texas

Sir:

We enclose check for \$1.00 for which please send us a copy of "THE IRON AGE Directory of Tool Steels."

J. R. McCARRON,  
District Manager  
Vanadium-Alloys Steel Co.,  
Latrobe, Pa.

Sir:

Please send a copy of your publication "1500 Tool Steels," a directory of tool steels and other metal cutting materials by T. W. Lippert.

C. H. SPEAKMAN,  
Tool Supervisor  
Underwood Elliott Fisher Co.,  
575 Broad Street,  
Bridgeport 9, Conn.

The cost \$1.00 each for fewer than five. In larger quantities, 50c. each.—Ed.



## "HOW DOES MUEHLHAUSEN MAKE THOSE SUPER-SIZE SPRINGS?"

Well—it's this way. Those big babies must be coiled hot, to extremely close tolerances...and produced in quantity at P-38 speed. It's specialized work that demands very specialized equipment. So—Muehlhausen has one huge plant totally devoted to hot forming. It is all conveyorized. Production is governed by a central laboratory. The quenching tanks are the size of swimming pools, and skyscraper-like shot blasters give springs clean, lustrous finish and added life.



Automatic tapering of bar ends prior to coiling



Precision hot-coiling springs on automatic equipment



Precision grinding squares both spring ends at once



Shipping finished springs in carload lots

*To improve product performance, use*

**MUEHLHAUSEN**  
**Designed**  
**SPRINGS**

To really appreciate how your production schedule and product can benefit by these extensive facilities, call Muehlhausen in on your next spring job. Write for new booklet on hot-coiling springs.

**MUEHLHAUSEN SPRING CORPORATION**

Division of Standard Steel Spring Company  
817 Michigan Avenue, Logansport, Indiana

# This Industrial Week .

- Recall of Steel Experts to Washington Produces Results Quickly
- Steel Order Volume in January-February 25% Ahead of Year Ago
- Chicago Firm Gets Contract for 30,000 Freight Cars for France

WHILE the steel industry this week continued to struggle with manpower and production problems, steel requirements in the form of commitments for delivery over the next quarter probably represent one of the toughest challenges to the industry since the war began. The greatest emphasis will be upon those orders tagged for the military. Although the latter was not being allotted the amount of steel it requested for the second quarter, both the Army and the Navy on actual allotments to them came out far better than any of the other war agencies.

In the face of increasing transportation needs, the second quarter requests of the Office of Defense Transportation were slashed considerably. While railroad authorities do not minimize the importance of Army and Navy demands, they still point out that the nation's transportation system cannot long continue to have its requirements continually cut. It is recalled that throughout 1944 the railroads were unable to obtain the amount of steel which they thought necessary to keep the transportation system in "fair" shape. Some even believe that the setbacks in the recent severe weather period were accentuated by the fact that equipment was worn out and replacements and repairs on a greater scale had been made impossible because of the supply situation.

Forms of transportation other than the railroads have also suffered due to cutbacks in their estimated needs. On the home front it is becoming increasingly apparent that bus service for war workers and other essential employment continues to deteriorate due to lack of parts and supplies, as well as due to manpower shortages. In the drive for more war work such factors may not be too small when absenteeism is being analyzed.

Reports from steel centers indicate that the return of key steel industry men to the WPB steel division has already been felt by a reduction in the volume of order directives. The latter have involved so much tonnage recently that they were already threatening the entire system known as the controlled materials plan for the distribution of steel. These steel experts will probably have high on their docket of unfinished business a close scrutiny of the current Army-Navy domination of steel distribution and scheduling.

STEEL operating men this week were convinced that unless considerable additional manpower can be made available, steel schedules must be put on a more realistic basis. Much of the steel demand from agencies other than the Army and the Navy, which has been trimmed down for the second quarter, is so intertwined with ultimate war needs that such slashing may in the long run tie up some major war projects.

Steel order volume, although having declined in recent weeks from the record-breaking January level, was nevertheless somewhat ahead of actual shipments. This may not be as bad as it seems since the enlargement in backlog has been due in a large part to

greatly extended deliveries. Steel consumers have had to place their orders so far ahead that some business is being labeled for first and second quarter delivery, 1946.

For the country as a whole steel order volume during the first two months of this year is estimated to be about 25 per cent ahead of the same period last year. The over-sold condition in the industry is indicated by reports that some major producing units orders during the first few weeks of February exceeded shipments by as much as 60 per cent.

One problem of the military which must be solved by the WPB steel experts is the Navy's plan to purchase 1950 warehouse buildings to require about 12,000 tons of galvanized sheets. Directives will be asked for this tonnage, it is understood, in order to insure delivery before next year. Such an increase in directives may well be the starting point of a thorough house cleaning in the steel delivery picture. Another heavy inquiry is shaping up calling for close to 400 large portable hangars for which the United States Engineer's Office is taking bids. Believed to be a portion of this program are 199 hangars for the U. S. Engineers, Columbus, Ohio, involving 26,000 tons of structural steel.

OF great interest in the railroad construction field is the reported award, on a prime contract, for 30,000 box cars for France to International Railway Car & Equipment Mfg. Co. with offices in Chicago and a plant at Kenton, Ohio. It is expected that a portion of the order will be sublet. Pullman-Standard has been awarded 3000 and American Car & Foundry 2000 56-ton flat cars for Russia. Heavy demand is reported for standard rails for export—particularly for South America.

Warehouses were given load directives this past week on plates, structural and bars. In addition, they were given a ceiling on the amount of material they can take in. This is said to be a little out of the ordinary, because previously they were assigned a minimum which the producer had to furnish, based on turnover during normal times. The load ceiling might have resulted because this minimum plan is falling into disuse.

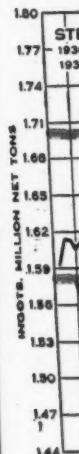
National steel ingot production gained one point this week to 95.5 per cent of rated capacity from last week's revised rate of 94.5 per cent. Output gains occurred in the following districts: Pittsburgh, up three and a half points to 92 per cent from last week's corrected rate of 88.5 per cent; Youngstown, up three and a half to 92 per cent; Cleveland, up one and a half points to 97.5 per cent; Wheeling, up two points to 90 per cent; Birmingham, up two to 99 per cent; the Western District, up two and a half points to 91 per cent and Cincinnati, up six and a half points to 101 per cent. Chicago at 100 per cent; Philadelphia at 97 per cent; Buffalo at 104.5 per cent; Detroit at 97.5 per cent; St. Louis at 94.5 per cent and the Eastern District at 95 per cent continued unchanged.

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• **ARMY SPARE PARTS**—The Army is believed to have run down its reserves of spare parts for tanks, trucks and other rolling equipment to very low levels, which leads to the anticipation in some quarters that this branch may move into the market and begin to buy soon, thus complicating the machine shop picture.

• **FRENCH DRUM PLANTS**—French drum plants will fabricate containers requiring 100,000 tons of sheets during the first six months of 1945 for our Army and Navy. Order directives have been utilized to place this material, about 65 to 75 per cent of which is cold rolled, with American mills. With WPB holding the sack for nearly 150,000 tons of sheets needed for early delivery for which it cannot find a home, domestic drum makers will be asked to return a portion of their first quarter allotments to make room for the French order.

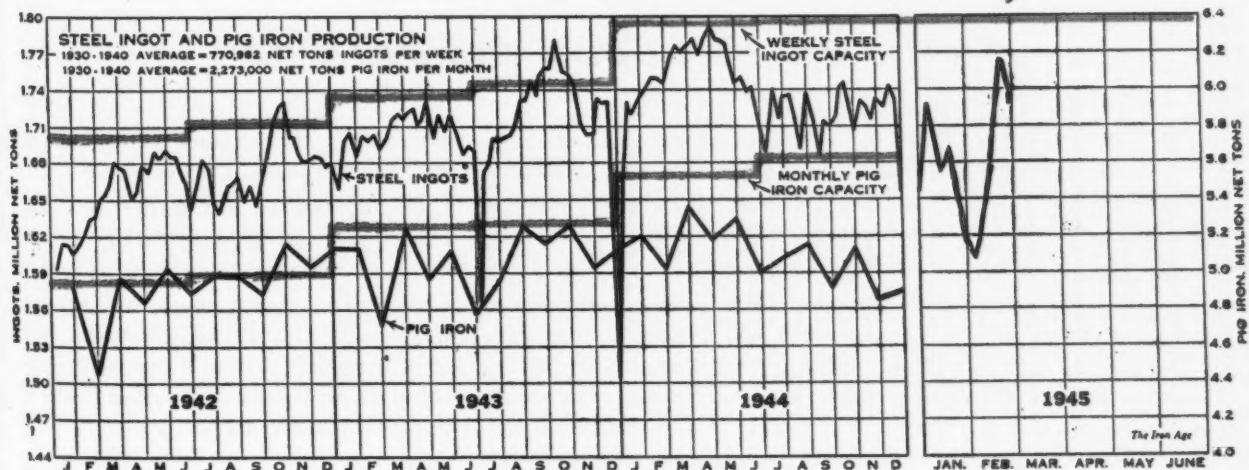
- **SPRING STEEL SHORT**—WPB says the supply of spring steel will become increasingly short soon. No increased production can be expected due to the steel plant manpower shortage. Thus present usage levels of 50 per cent of 1941 by weight will have to be maintained.

**• SCRAP STOCKS REACH TWO-YEAR LOW**—Stocks of iron and steel scrap at plants of consumers, suppliers and producers continue to decline, approximating 5,335,000 gross tons at the end of December, 1944, a change of 5 per cent from the 5,624,000 tons reported on Nov. 30, according to the Bureau of Mines. This low inventory was the result of almost constant decreases throughout the year, which produced a total loss of about 1,125,000 tons from Jan. 1, 1944; with over 600,000 tons of this decrement occurring in the last 3 months of the year. Consequently, stocks of iron and steel scrap at the end of the year 1944 were the lowest they had been since August, 1942, when they amounted to 5,279,000 tons. Consumers' stocks at the year end were 3,951,000 tons, compared with 4,277,000 tons on Nov. 30, while combined stocks of suppliers and producers were 1,384,000 tons and 1,347,000 tons on the same dates. A decrease in stocks of purchased scrap held by consumers, totaling 259,000 tons, was the major factor in the new loss in total inventories; while a reduction in stocks of home scrap, amounting to 67,000 tons, was also a contributing element.

• **FREIGHT CARS ON ORDER**—Class I railroads on Feb. 1, 1945, had 36,734 new freight cars on order, according to the Association of American Railroads. On the same date last year, they had 33,411 on order. New freight cars on order on Feb. 1 this year included 7086 hopper, 5763 gondolas, 850 flat, 18,997 plain box, 1771 automobile, 2158 refrigerator and 109 stock freight cars. They also had 451 locomotives on order on Feb. 1, this year, compared with 863 on the same day in 1944. The number on order on Feb. 1, 1945, included 80 steam, two electric and 369 diesel locomotives compared with 303 steam, two electric and 558 diesel one year ago.

• **SCRAP INDUSTRY CRITICAL AGAIN**—Collection and distribution of iron and steel scrap has again been placed in the "critical" category by the War Manpower Commission, and the United States Employment Service is being advised by WMC to give scrap yards preferred treatment of available referrals of manpower. In some regions of the War Production Board, scrap dealers are being asked to advise the salvage division whenever immediate referrals for key employees, such as crane operators or foremen, are not forthcoming, or if adequate referrals for other jobs do not appear from USES within two weeks.

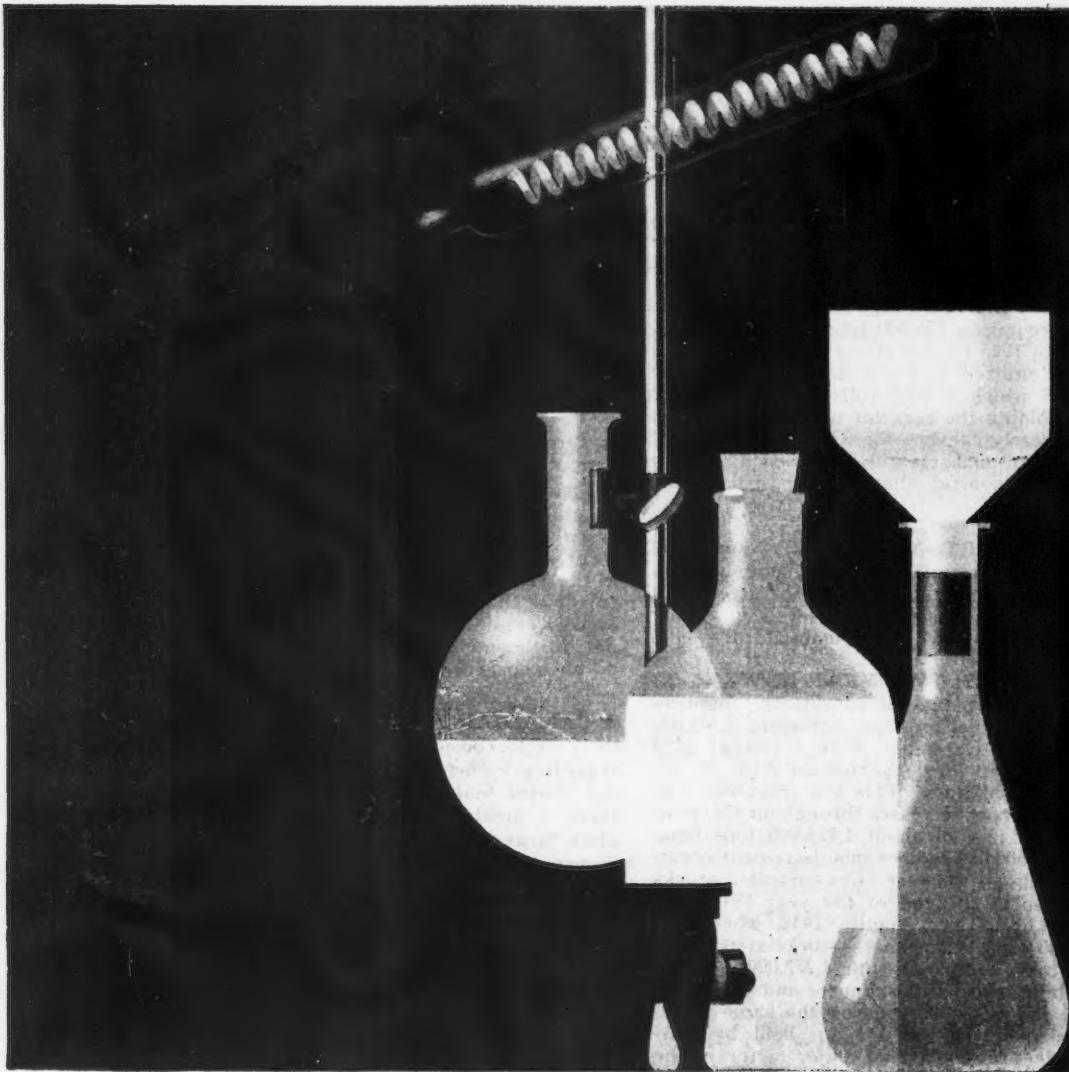
• **CANADIAN STEEL PRICES**—Over the past two or three weeks considerable discussion has developed in Canada regarding higher prices for steel along lines proposed in the United States. With a possibility of advancing prices there, a number of consumers have been endeavoring to place large tonnage contracts for iron and steel and are prepared to take immediate delivery. However, producers are not accepting orders beyond actual needs of consumers, both for their own protection and under restrictive orders from Canada's Steel Controller, and on all new contracts it is specified that price will be made known at time of delivery. So far there has been no intimation from government circles regarding any advance in ceiling prices for steel or other materials, but in the event of permission to increase steel prices, Canadian producers are protecting their position by basing prices on new orders as "at time of shipment" similar to U. S. practice. This policy has been in effect almost since the beginning of the war.



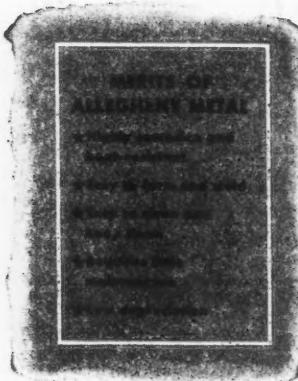
### Steel Ingot Production by Districts and Per Cent of Capacity

Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	Cleveland	Buffalo	Wheeling	South	Detroit	West	Ohio River	St. Louis	East	Aggregate
February 20 ...	88.5°	100.0	88.5	97.0	96.0	104.5	90.0	97.0	97.5	88.5	94.5	94.5	95.0	94.5°
February 27 ...	92.0	100.0	92.0	97.0	97.5	104.5	92.0	99.0	97.5	91.0	101.0	94.5	95.0	95.5

"Panhead"



## STAINLESS STEEL... METAL *Par-excellence* FOR THE PROCESS INDUSTRIES



THERE are a lot of new faces along the street—high-octane gas, synthetic rubber, magnesium, dehydrated foods, war chemicals and explosives, just to name a few.

But Allegheny Metal kept pace—with new grades, new techniques to meet the requirements for processing these products. There was the need for high-resistance to chemical attack, and to oxidation at heat—the need for great strength, long life, easy cleaning and freedom from con-

tamination—requirements, all of them that stainless steel answers best.

If—somewhere along the line in the manufacture of food and dairy products, drugs and chemicals, oil and plastics, textiles and paper—your plans would be profited by a steel with Allegheny Metal's special qualifications, let us help you develop them. Allegheny Ludlum Steel Corporation, Brackenridge, Pa.

Allegheny Metal is also handled and stocked by Joseph T. Ryerson & Son, Inc. warehouses

W&D 9370-C

# ALLEGHENY METAL

*The Time-Tested Stainless Steel*

REMEMBER THE NAME TODAY FOR THE NEEDS OF TOMORROW

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## Army and Navy Receive Record Allotments for Second Quarter of 1945

### Washington

• • • At the cost of other claimant agencies the Army and Navy have been allotted more steel for the second quarter of 1945 by the WPB Requirements Committee than ever granted them in any previous quarter. The Army was given 4,256,000 net tons of carbon and 786,000 tons of alloy steel. It had requested 4,521,790 tons and 846,141 tons respectively. The Navy was allotted 1,214,000 tons of carbon and 323,000 tons of alloy steel. It had asked for 1,308,600 tons of carbon and 348,800 tons of alloy steel.

In the first quarter, their previous record allotment, Army was granted 3,719,900 tons of carbon and 652,100 tons of alloy steel. The Navy's first quarter allotments were 1,207,200 tons of carbon and 347,400 tons of alloy steel, the latter 24,000 tons less than it received for the first quarter.

The granting of higher allotments for the Army and Navy was in keeping with the increasing demands for munitions. WPB reduced its tickets for the second quarter by 1,443,000 tons of carbon steel, which was cut down in order to increase alloy allotments.

Second quarter allotments for claimant agencies other than the Army and Navy and the amounts in tons each had requested were as follows:

Maritime Commission: Carbon steel, 921,000 tons allotted; 969,442 tons requested; alloy steel, 5000 tons allotted; 3317 tons requested.

WPB Operations Vice-Chairman: Carbon steel, 2,977,000 tons allotted; 3,657,000 tons requested; alloy steel, 389,600 tons allotted; 488,500 tons requested. This category includes OCR, National Housing and B products generally.

PAW: Carbon steel, 412,000 tons allotted; 436,180 tons requested; alloy steel, 99,500 tons allotted; 106,700 tons requested.

ODT: Carbon steel, 1,065,000 tons allotted; 1,527,000 tons requested; alloy steel, 95,500 tons allotted; 134,100 tons requested.

FEA: Carbon steel, 893,000 tons allotted; 1,468,300 tons requested; alloy steel, 38,000 tons allotted; 49,600 tons requested.

WFA: Carbon steel, 873,000 tons

allotted; 1,063,085 tons requested; alloy steel, 13,200 tons allotted; 16,634 tons requested.

Aircraft Resources Control Office: Carbon steel, 275,000 tons allotted; 317,538 tons requested; alloy steel, 16,500 tons allotted; 18,622 tons requested.

Reserves: Carbon steel, 1,680,000 tons allotted; 2,036,000 tons requested; alloy steel, 68,700 tons allotted; 76,700 tons requested.

OCR, exclusive of WPB Operations Vice-Chairman: Carbon steel, 28,000 tons allotted; 47,025 tons requested; alloy steel, 200 tons allotted; 209 tons requested.

Miscellaneous: Carbon steel, 189,000 tons allotted; 200,015 tons requested; alloy steel, 265,000 tons allotted; 285,560 tons requested.

## Public Inspection to Be Rule On Future Surplus Machine Tool Sales

By W. A. LLOYD

• • •

**Cleveland**

• • • Machine tool dealers here, who for months have evinced more than a passing interest in the disposal of government-owned machine tools, perked up their ears this week when J. A. Fraser, manager of the Reconstruction Finance Corp.'s disposing loan agency in Cleveland announced that in the future all government-owned surplus property sales made by the RFC, including machine tools, would be open to public inspection regardless of how small or large the dollar amount involved.

This was news. Aside from a statement made last October by an official of the same agency that there

were more requests for standard machine tools than could be filled, surplus machine tool disposal here had been shrouded in a quasi military secrecy, free from fear or favor and aloof from dealers and the Fourth Estate alike.

With this announcement came the statement that surplus property assigned to Cleveland's RFC agency for disposal as of Dec. 31, 1944, had an acquisition cost of \$4,479,101, and in addition, similar regional records listing a general description of each item sold, its condition, whether used, new, obsolete, damaged, or reconditioned, acquisition cost, sales price, to

**JET TAIL PIPE:** The jet from one of the General Electric gas turbine engines is shown for the first time at close range in this photo of the P-59A jet powered trainer. Mechanics are praising the ease of servicing the engines of the craft.



whom sold, and the address, were being made public in the RFC's 22 other disposing loan agencies.

But among the dealers who accepted this gratuity with grace, parabolic pundits pointed to the machine tool melee following World War I and wondered first, if background for another were not in the making, and second, that while surplus disposal was in a state perhaps best described as fluid, why a more concerted effort to list machine tools available for disposal could not be made. With rumors rife about procurement agencies ordering new machines from manufacturers while identical models stood in forgotten corners, idle, this was almost understandable.

According to the announcement, the Government's goldfish policy is to be implemented with respect to RFC transactions in several ways. Sales lists will be supplied to newspapers, trade journals, and other interested publications, as well as trade organizations, and lists will be posted on public bulletin boards in RFC agency offices. A detailed record of individual transactions, supplying all bids, whether successful or not, time, place, and type of sale, and other information is to be available for inspection at RFC agency offices upon request.

"Reports," said Mr. Fraser, "will be made public twice a month, covering the periods from the first to the fifteenth and from the sixteenth to the last day of the month inclusive. These reports will cover all sales, and the step has been taken with the approval of the Surplus Property Board which, under the Surplus Property Act, sets disposal policies. The goldfish bowl policy is high on the list and was incorporated in the act by Congress."

Sales are not restricted to property declared surplus within any one agency's territory or local jurisdiction. For example, the territory served by the Cleveland office covers Ohio, western Pennsylvania, eastern Kentucky, and northern West Virginia. A prospective buyer in this region has only to contact the Cleveland office to obtain information regarding materials and production equipment he wants to acquire, whether the property has been declared surplus in this region or another RFC region.

Sample sales noted in the first report were:

K. B. Cleaning Co., Cleveland.  
1 each used ball bearing bench buffer, \$111.19.  
Dade Brothers, Inc., Mineola, N. Y.  
1 each used—usable without repairs



MONTGOMERY'S OFFENSIVE: Moving along a mud-filled road to a forward position in an offensive recently launched southeast of Nijmegen, a tank pulls a sledge filled with anti-tank ammunition.

—good 4 track nailing machine, complete, \$462.94.

Westinghouse Electric & Mfg. Co., Mansfield, Ohio.

1 each used Cincinnati Bickford Drill Press, \$7,428.22.

Perfection Steel Body Co., Galion, Ohio.

1 each used—good South Bend Precision Lathe, 16 in. x 6 ft., \$670.20.

E. I. du Pont de Nemours, Tyler, Tennessee.

5 each used good 7½-hp. electric motors, \$526.20.

Witteman Co., Alhambra, Cal.

1 each used good 4-spindle Conomatic Screw Machine, 3½ in., \$6,967.63.

Quality Tool & Machine Co., Akron, Ohio.

1 each used good Reed & Prentice Model AA Engine Lathe, with standard equipment, \$1,956.96.

Follansbee Steel Corp., Toronto, Ohio.

1 each used good 5-ton Whiting Crane, \$2500.00.

Chase Copper & Brass Co., Waterbury, Conn.

2 each used good 7½ hp. electric motors, \$328.00.

E. F. Hauserman Co., Cleveland.

1 each used No. 13 NATCO Multi-Spindle Drill, \$856.56.

General Electric Co., Erie, Pa.

1 each used 6A-Marvel High Speed Hack Saw, \$711.20.

Pennsylvania Railroad, Altoona, Pa.

1 each used Cincinnati 5/48 Plain Hydromatic Milling Machine, \$8007.20.

Conrad Tool & Production Co., Lincoln Park, Mich.

1 each used Acme Universal Turret Lathe, 6 W, \$2636.82.

Miles Mfg. Co., Cleveland.

1 each used South Bend Precision Turret Lathe, \$1492.58.

Implicit in the compilation of these detailed reports of all RFC transactions, twice a month, is a splendid public service and one which will certainly increase the work burden of the organization to a considerable extent, but to dealers, whose blood pressure was rising commensurately with the surplus, it looked like the Government was going to be in the machine tool business for a long time.

But they were not alone in their troubles . . . for coincident with the RFC announcement, and close upon the heels of another by the War Production Board to the effect that the automatic screw machine industry is producing at only 60 per cent of capacity, O. B. Werntz, executive secretary of the National Screw Machine Products Association, estimated that fully 25 per cent of the screw machines in northern Ohio and throughout the entire country are idle because of the shortage of set-up men.

According to Mr. Werntz, about 375 set-up men are needed for the screw machine products industry in northern Ohio alone, and about 2500 throughout the entire country.

Probably the most acute shortage reported here was at the National Acme Co., where T. L. Strimple, assistant secretary said, "We're operating only 65 per cent of the machine hours we could run if we had the manpower we need. Our greatest shortage is for 20 highly skilled, all-around automatic set-up men, but we also need 200 machine hands and 100 unskilled workers."

At National Acme employment has



**JAPANESE PRISONERS:** Screening cement to dry it out after a rain squall, Japanese prisoners of war work under American Guard at a base in the Marianna Island in the Pacific.

dropped from around 5200 to 3000. "We've been hit particularly hard," Mr. Strimple reported, "because in 1938 we started a training program to teach younger men to do set-up work, and many of them, just as we got them trained, have been drafted. We have 53 furloughed soldiers here, but we can't get any more, and draft boards refuse our appeals for deferments."

Activated by military necessity, the draft's gulps at National Acme, and numerous other companies, have posed a serious situation. F. H. Chapin, company president, recently stated in his year-end report that the average number of employees in 1944 was more than 40 per cent below the 1942 peak, due largely to draft losses. At this time, the company has unfilled orders sufficient to insure better than normal operations during 1945. Certainly some of this backlog stems from the increased ammunition program calling for an increase this year of 150 per cent over the January, 1944, production rate, and a 65 per cent boost over the current production rate.

For one fuze program alone, 1945's projected increase is 11,000,000 fuzes a month greater than 1944.

With WPB pointing out that an average of 17 other workers of lesser skills are unable to perform their functions when one set-up man is lacking, while machine tool companies hope for help in the form of furloughed soldiers, and be-deviled dealers doting on surplus disposal through channels involving them, it seemed that the machine tool situation had finally reached its long-predicted impasse.

### Steel Industry Men Seek Ways to Hold Ingot Output Steady

#### Washington

• • • No let up in steel demand is expected when the war with Germany is ended, Lieut. Gen. Brehon B. Somervell, Army Service Forces Chief, told steel industry leaders Feb. 22 in their regular monthly meeting.

Threatened by floods and a coal strike around April 1, and forced to improvise because of selective service withdrawals of men in the 26-29 group, the committee met to discuss methods of maintaining operating rates in the face of a loss of 350,000 tons of production in January and a potential carry-over of 3,000,000 tons into the second quarter.

WPB Chairman J. A. Krug told the committee he has appointed an emergency committee on steel problems to meet current crises.

Members of this committee are: Hiland G. Batcheller, president of Allegheny-Ludlum Steel Corp., Pittsburgh, and WPB chief of operations, as chairman; Norman W. Foy, Republic Steel Corp. executive, Cleveland, as vice-chairman; Brig. Gen. H. C. Minton, Army; Rear Admiral A. M. Charlton, Navy; Brig. Gen. William C. Rose, WMC; and H. M. Chapman, representing the Solid Fuels Administration.

WPB said this committee is expected to review the entire steel supply and demand situation for the second and succeeding quarters of this year with a view to making recom-

mendations to assure that all essential requirements will be met.

To stave off the threatened disruption of CMP operation, the WPB Requirements Committee has agreed to restrict second quarter steel allotments to 104 per cent of estimated supply and agreed that there would not be any new supplemental military allotments before the half year ends.

The danger of CMP breaking down and letting the steel situation rocket into the same "inflation" as it did when the PRP and priorities system fell apart, was brought on by the allotment of 114.6 per cent of estimated supply in the first quarter and the granting by WPB of tickets for an additional 870,000 tons of steel the first two weeks in January.

The reduction of allotments in the second quarter to 104 per cent of supply is expected to wipe out one-half of the 3,000,000-ton carry-over by the end of the second quarter and put CMP back on its feet once more.

Estimated supply of carbon steel for second quarter is 14,183,000 tons and of alloy steel is 1,876,000 tons.

Though the industry lost some 350,000 tons of steel in January because of the coal embargo and the weather, there were some gains. On Feb. 9, the Production Executive Committee gave the steel industry the highest manpower priority permitting them to recruit labor anywhere and Mr. Krug focused national attention on the steel situation on Feb. 15 by declaring that steel in related industries had a manpower deficit which might be as high as 100,000 workers.

### Lukens Sales Increase But Income Declines

#### Coatesville, Pa.

• • • Net sales of Lukens Steel Co. and subsidiaries for their 1944 fiscal year, which ended Oct. 7, 1944, were \$54,743,937.20 compared with \$52,338,397.04 in their 1943 fiscal year. Net income for the 1944 fiscal year was \$682,956.52 or \$2.15 per share of common stock compared with \$1,317,280.86 or \$4.14 per share for 1943.

For the first quarter, ended Dec. 30, 1944, of the companies' 1945 fiscal year, net sales were \$13,085,585.50 compared with \$10,141,928.85 for the similar period of their 1944 fiscal year. Net income for the first quarter of the present fiscal year was \$36,774.38 compared with \$115,586.13 for 1944.

## Warehouse Men Get Price Relief in Order Effective March 1

### Washington

• • • Effective on March 1 OPA has authorized iron and steel warehouse dealers and jobbers to pass on to their customers increases for four basic steel products which became effective Jan. 11 and which up to this time they have had to absorb. The interim increases may be charged by exporters and by amendment to Price Schedule No. 49 and No. 6, the interim increases may be quoted as mill base prices instead of delivered prices.

In a statement of considerations to Amendment 29 to Price Schedule 49, OPA said Amendment 11 to Price Schedule 6 increased the maximum prices which producing mills may charge for certain products. Amendment 12 now being issued, OPA said, has the effect of translating those increases into mill basing point prices rather than the maximum delivered prices.

Continuing, the statement said that it is specifically provided, however, that such increases shall apply only to the mill base prices for prime quality material and that the maximum prices for secondary materials may remain unchanged.

The four products on which ceilings were increased on Jan. 11 were hot rolled carbon plate increased 10c. per 100 lb.; hot rolled carbon steel sheet increased 10c. per 1000 lb.; galvanized sheets, roofing and siding, increased 15c. per 1000 lb., and rails, all types, increased \$3 per gross ton. The increase of 25c. per 100 lb. on nails and staples other than galvanized was

permitted to be passed on by warehouses and jobbers in the Jan. 11 order.

OPA pointed out that warehouses had not been allowed to pass on to their customers the interim price increases, except those applying to nails and staples because they had not furnished information needed to determine whether the increase could be absorbed at the warehouse level. The information is now being supplied, OPA said, and will be used to determine price increases.

mine the extent to which warehouses and jobbers may absorb increases in the mill price. Pending examination of the financial data, the warehouses were authorized to pass on the interim price increases.

OPA emphasized that at the time of any further increases or adjustments in the present interim mill base prices, warehouse and jobber mark-ups will be extended and adjusted to reflect the industry's ability to absorb mill price increases.

## Ordnance Output In January in Pittsburgh Totals \$32 3/4 Million

### Pittsburgh

• • • War goods manufacturers of the Pittsburgh Ordnance District were commended this week by Col. Robert C. Downie, district chief, for whole-hearted response to the Army's request for more guns and shell during January.

During the initial month of 1945 the Pittsburgh Ordnance District accepted \$32,772,000 worth of war materiel produced on prime contracts alone. This is the largest amount ever accepted in any one month. By way of contrast, the highest monthly acceptances on prime contracts only in 1944 were \$28,085,000. January was also a record-breaking month in the placement of new contracts. New orders placed in January amounted to approximately \$100,000,000.

It will be several months before the peak schedules on the new orders placed in January are reached. Record-breaking production of material in January is expected to result in

still higher production rates during the next several months.

Some of the individual items that were procured during this record-breaking month of January are as follows:

Shot and shell, 20 mm. to 240 mm.	1,266,414
Bombs, all sizes and types.....	644,948
Adapters, boosters, primers and other metal parts for bombs and shell .....	20,849,655
Fuses, all sizes and types.....	3,493,437
Guns, gun tubes, carriages and mounts .....	208
Metallic belt links, time train rings and clay targets.....	33,242,968
Parachutes for bombs and flares...	14,800

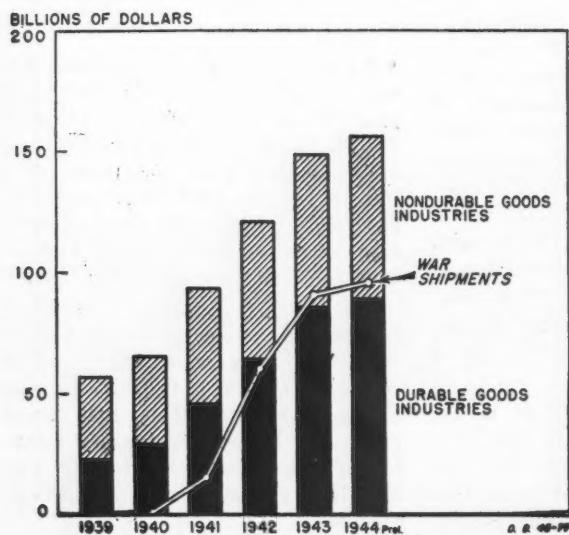
## New Rules Governing Spot Authorizations Announced by WPB

### Washington

• • • New rules announced last week by WPB make it possible for the board to grant spot authorization for the production of items in cases where applications for permission to produce civilian goods were filed under the CMP or some other WPB procedure. In these cases the applicant would receive a deferred allotment if he gets any authorization to purchase material.

Under the original spot authorization rules only these products that were subject to L or M order limitations were eligible for spot authorizations. Under the new amendment to PR 25 it will be possible for WPB to grant spot production authorizations for a larger number of civilian type items.

The amendment also permits appeals under orders that are subject to spot procedure. Formerly, appeals for permission to make products, the manufacture of which was prohibited or limited by an L or M order, were not permissible if a spot authorization for their production could be obtained. However, in actual practice, it has been found that this rule was not equitable in all cases and it was decided to change it through this amendment.



**MANUFACTURERS' SHIPMENTS:** According to the U. S. Department of Commerce, manufacturers' shipments established a new high in 1944. The estimate is \$156 billion, a gain of 5 per cent over 1943 and nearly three times the 1939 dollar value. This chart indicates that the further advance in sales during 1944 was moderate, contrasting with the rapid expansion reported in the preceding years.

**Marines Costliest**

•  
**The Generals**

•  
**Island**

•  
**Men In The Sands**



Maj. Gen. C. B. Cates  
The Fourth

Maj. Gen. K. E. Rockey  
The Fifth

Maj. Gen. G. B. Erskine  
The Third

The invasion of Iwo Jima by the Marines Third, Fourth, and Fifth Divisions became a hand weapon battle when soft lava sands bogged down all vehicles. Mortar and machine gun fire pinned the men to the beaches making it the costliest battle in Marine history. After landings on two beaches, Marines fought foot by foot down the island, hand to hand across the runways of Airfield No. 2, to dominate the strategic island.



## Clad Metal Program Expansion Points to New Russian Strip Business

### Pittsburgh

• • • Contracts have been placed in the Pittsburgh district for about \$2,500,000 worth of copper clad 30 and 50 cal. bullet jackets, and the revitalized program of jacket manufacture is moving along at a rapid pace. Superior Steel Co., Pittsburgh, the leader in the clad metal production, and Weirton Steel Co., Weirton, W. Va., will supply the copper clad strip for the three cup and jacket producers in the area: Steel City Electric Co., Pittsburgh, Wolverine Supply and Mfg. Co., Pittsburgh, and Louis Marx, Glendale, W. Va. Pittsburgh's share in the total national program is upwards of 75 per cent.

A total of about 350 tons of the clad metal was produced here during February for 30 and 50 cal. jackets, and at least 640 tons per month will be forthcoming during March and April. While production of the clad metal has already started here, it is believed that the balance of the program let outside the district has not yet reached the production stage.

Over and above the present program that has been let out in contracts with strip and jacket producers, by the Army Ordnance Department, Russia is negotiating for some extremely large quantities of clad strip. It is believed that they want even more than the Ordnance Department has requested and that the strip will be shipped to Russia for fabrication into jackets. Russia is not a new buyer of this material, because prior to the time that it was needed by the American armed services, Russia, China, Great Britain, and Canada had all purchased clad metal from the United States.

The clad metal desired by the Russians is slightly different from that used in producing bullet jackets for the United States Army. The copper coating that becomes the inside of the Russian bullet jackets is extremely thin, whereas American jackets have quite a substantial copper coating on the inside.

Of course, along with the plan to increase clad strip production is the program of getting cup and jacket producers back into business on this vital war item. As previously stated, Steel City Electric Co., Wolverine Supply & Mfg. Company, and Louis Marx Co., will fabricate 30 and 50 cal.

jackets. The rush to get jacket output started was indicated in the recent approval of an expenditure of about \$110,000 by the Steel City Electric Co., North Side, Pittsburgh, for the construction of a plant addition to house jacket making equipment. Steel City had been a jacket fabricator during the last heavy production splurge, a little over a year ago, but since that

time had taken heavy orders for electrical equipment and now has to have additional plant space to handle this re-instated business.

While present contracts for clad metal for 30 cal. jackets run through only to June, it is believed continuation contracts will be issued to carry the program through until at least October. On the 50 cal. program, contracts run through April, but these too are likely to be extended. The 50 cal. program as currently scheduled is about four times greater than the 30 cal. program.

### Issues Explanation On Steel Drum Quotas

#### Washington

• • • WPB recently issued an explanation of the alternate quota method of computing the tonnage of new steel drums that may be used to pack the classes of commodities set out in Schedule A of L-197 to fill industrial orders in the first quarter of 1945.

Direction 3 to L-197 explains that the alternate quota is the same as the tonnage of new steel drums permitted as the quota for the fourth quarter of 1944, including any tonnage increases in the quota authorized in that quarter. Drums authorized for packing commodities listed in Schedule B must be excluded.

The quota tonnage may not include any unused tonnage of third quarter quota carried over and permitted to

be used in the fourth quarter of 1944, nor any tonnage of the first quarter 1945 quota permitted to be borrowed and used in the fourth quarter of 1944. The alternate quota may not include any tonnage of new steel drums representing a percentage of fiber drums used in 1945, permitted to be used in the fourth quarter of 1944 in addition to that quarter's quota.

Regardless of whether or not the special alternative quota is used, a person may use in the first quarter of 1945, in addition to his regular quota, whatever tonnage is left over from his fourth quarter quota and all or any part of his 1945 permitted tonnage of drums covering the specified percentage of fiber drums used in 1943. However, such a user must deduct from his first quarter quota any tonnage borrowed from his 1945 first quarter quota and used in the fourth quarter of 1944.

**RETRIEVED:** American tank destroyer is being uprighted with the aid of tank retriever and crew. It had slid over an embankment from an icy Belgian road and had turned turtle.



## Batcheller Report Describes Steel Carryover for Second Quarter

### Washington

• • • In a current report on war production programs, which he said have become increasingly critical in a wide range of output, Hiland G. Batcheller, WPB chief of operations, said that the most serious of all has been the loss of steel production, due in part to manpower shortages and in part to the weather. Most of this loss, he said, does not show up in finished munitions deliveries in January, but in many cases it will set back the program in February, March and the second quarter. This, it was pointed out, adds to the difficulties of achieving the immediate objective for a steady increase in munitions output to an all time peak in June. January, it was pointed out, was scheduled for only a one per cent rise over December but output fell one per cent below that month. Among the major classes of munitions January production was ahead of schedule only in ammunition. In January munition production amounted to \$4,816,000,000 or \$63,000,000 below December.

In the six weeks through Feb. 18, Mr. Batcheller said, steel ingot production ran approximately 90,000 tons a week below the average rate for last October and November. This decline, combined with a large increase in military demands and an increase in the proportion of allotment tickets "cashed" in first quarter has brought about a difficult steel situation, with

orders heavily overloaded and delivery dates greatly extended.

At present, Mr. Batcheller said, it appears that, owing to these developments, the volume of past-due orders on steel mills will increase tremendously this quarter, possibly 1,000,000 tons or more, raising the carryover into April to the highest level since the beginning of CMP.

The carryover was pointed to as having aggravated the second-quarter allocation program. Requirements for this period were stated to be 17,475,000 tons of carbon steel and 2,376,000 tons of alloy steel, a total of 19,851,000, or approximately 24 per cent above the 16,050,000 tons supply estimated by the Steel Division. Mr. Batcheller added that the second quarter supply may prove optimistic in that it makes no allowance for such factors and contingencies such as the drafting of workers in the 26-29 age group; the probability of spring floods; the critical situation in refineries and the marked shift in the carbon steel product "mix" and the simultaneous trend toward quality steels and the lighter gage flat-rolled products, which require additional manhours per ton and special preparation and treatment.

Mr. Batcheller said that if the war continues in both Europe and Asia, the steel deficit for the third quarter probably will be greater than that which faces the second quarter.

Regarding the shortage of coal, it

was stated that the situation is particularly bad in high-grade coking coals, required for by-product coke ovens. Stocks at many plants were said to be down to a week's supply or less, and, it was declared, "Any interruption of coal supplies—whether due to floods or other causes—would immediately cut steel operations sharply, as well as close down many industrial plants." It was also pointed out that natural gas companies supplying the Appalachian area were unable to provide enough gas to meet the increased loads caused by unusually cold weather.

Machine tools, Mr. Batcheller reported, may continue to be a bottleneck in some of the critical programs. The machine tool backlog on Dec. 31 included \$200,000,000 of rated orders, plus some \$60,000,000 of unrated orders. To this will be added some \$300,000,000 of tools for expansion of production in military programs in 1945, if present forecasts materialize. This, it was pointed out, would more than absorb the total production of the industry for the entire year at the present \$35,000,000 to \$40,000,000 monthly production rate, with no room for new direct or indirect military programs.

## Buick Starts Output On New Aircraft Engines

### Flint, Mich.

• • • Buick Motor Division has gone into production on two new types of Pratt & Whitney aircraft engines—an 1830 cu. in. displacement 14-cylinder Twin Wasp and a 2000 cu. in. displacement 14-cylinder Twin Wasp, designed for big bombers and military transports, respectively.

In addition to these jobs, two other 1830's for bombers and cargo planes are being produced, and the combination of the four power plants is expected to make 1945 a record output in this classification for Buick.

Substantial retooling, engineering and processing was carried out last year in order to bring the two new engines into production.

It was said that an absence of parts interchangeability between the two engines previously made and the two new ones required an almost complete new tooling job. About 50 per cent of production time required for these engines is carried out on machining operations at Flint, while other machining, final assembly and testing takes place at Melrose Park.

**SIEGFRIED DEFENSES:** Infantrymen of the 90th Division pass concrete dragon's teeth of the Siegfried Line in Habscheid, Germany, as they move up to the front.



## Military Requirements Force Severe Slash in Railroad Steel Request

### Washington

• • • Slashes of 30 per cent in carbon and 27 per cent in alloy steel in the ODT second quarter allotments allowed by WPB brought from ODT Director J. Monroe Johnson the statement that the cut is due to the heaviest military requirements of steel since the beginning of the war, and that it comes at a time when the transportation plant of the country is under a heavy strain to carry its wartime burden.

The cut was the deepest in the civilian transportation equipment program since the last quarter of 1943. ODT was allotted 1,065,000 net tons of carbon steel. It had asked for 1,527,000 tons. It was granted 98,000 tons of alloy steel. It had requested 134,000 tons. Mr. Johnson said that the necessary amounts of copper and aluminum were allotted to accord with the allotments of steel.

The second quarter ODT allotments of carbon steel for the more important items were:

Replacement Rail—417,000 tons for the railroads and 11,000 tons for transit lines. ODT had asked for 600,000 tons, or the entire controlled cooled rolling mill capacity.

Track Accessories—209,000 tons for railroads and 50,000 tons for transit

lines. ODT had requested 300,000 tons.

Railroad Freight Cars — 135,000 tons, or enough steel for 7500 cars, nearly all of which will be box cars. ODT had asked for 250,000 tons, which would make about 135,000 cars.

Locomotives—30,000 tons.

Railroad Passenger Cars—Disapproved entirely except for 252 tons of steel for the manufacture of 15 baggage and mail cars. ODT had asked for an average of 250 cars for each quarter of the year.

### WLB Rejects Request Of AFL-CIO to Adjust Little Steel Formula

### Washington

• • • Public Members of the War Labor Board on Feb. 23 turned down the AFL-CIO request for additional rupture of the Little Steel formula, by citing the threat of inflation and stating that the average hourly earnings for manufacturing industries have risen 36.7 per cent, compared to a 30 per cent rise in the cost of living.

CIO President Philip Murray immediately responded by saying that the report "fails to meet the needs of the

**REHABILITATION CAMP:** Veterans of World War II are being aided at Camp Legion, Dearborn, Mich. to return to a useful civilian life in their chosen field of work. Here veterans are shown working in the machine shop school.



**Passenger Carrying Highway Transport**—14,310 tons for integral buses, street cars, bus bodies and trolley coaches. ODT had asked for 18,250 tons.

**Motor Trucks**—67,000 tons.

**Truck Bodies, Trailers and Third Axles**—23,500 tons. ODT had asked for 31,800 tons.

**Automotive Replacement Parts**—130,000 tons. ODT had asked for 150,000 tons, or 5000 tons less than the first quarter allotment.

**Tank Trailers**—438 tons.

**Barges, Tugboats, Towboats and Workboats**—10,000 tons. ODT had asked for 19,000 tons.

nation," and that public members "possess no understanding whatever of the problems of war production nor of the national economy after VE-Day." He has called an extraordinary session of the CIO Executive Board to consider the public members' report, with conclusions to be presented to the President directly.

Meanwhile, the rumor that CIO labor members will withdraw in protest was underlined by their statement that "CIO members do not see how they can discharge their very deep responsibility to the nation and to labor" under present conditions. AFL members launched a frontal attack on the entire stabilization program.

Industry members said they agreed with the public members' stand but said that public members have made certain other recommendations designed to freeze wartime abnormalities in the basic peacetime wage structure and that they were studying the proposals carefully.

The report was delivered to Economic Stabilizer Fred M. Vinson for transmission to the President, along with comments from Mr. Vinson and possibly the reaction of OPA.

Detailed reports of industry and labor members are being prepared for presentation within 10 days. It is expected that Mr. Vinson will generally endorse the public members' proposals.

Though recommending against across-the-board wage increases requested by labor and public members acknowledged that wages may drop sharply during the reconversion period, unless prevented.

Public members recommended the following remedial procedure in lieu of broad scale general increases now:

1. The Fair Labor Standards Act

should be amended to establish minimum rates for key occupations above the 40c. an hr. general minimum now prevailing under the law, thereby covering higher wage as well as lower wage workers.

2. A program to raise the general level of real wages should be incorporated in a national "plan for prosperity" dealing simultaneously with all sectors of the economic front.

3. The board should be prepared to use its authority to prevent wage cutting during the reconversion period.

4. Meetings between organized labor and management on special aspects of the reconversion problem, to explore the advisability of holding a general industry labor conference "to deal with basic principles and mutual obligations which when formulated might be incorporated in a national agreement."

5. Rules should be developed for the making of reconversion wage and price adjustments.

### Passenger Car Plants Of Pullman Co. to Be Revamped in New Plan

#### Chicago

• • • Modernization and plant construction costing several million dollars to prepare its plant for speedy production of railway equipment is anticipated by Pullman - Standard Car Mfg. Co., it is announced here.

The company points out that if the railroads are to preserve a strong competitive position they will need to replace obsolete and war-worn rolling stock as soon as possible.

"Toward this end we have already prepared and shown to hundreds of railway officials our blueprints, models and mockups of passenger cars radically different in hundreds of interior features from anything now on the rails," declared Wallace N. Barker, vice-president. "Naturally we want to be ready to supply this equipment rapidly as soon as conditions permit."

The Chicago and Worcester, Mass., plants will be revamped for the resumption of passenger car construction, with the latter also scheduled for additional changes and new machinery for the better manufacture of modern transit equipment. The company's four freight car plants in Hammond and Michigan City, Ind., Butler, Pa., and Bessemer, Ala., are scheduled for alterations to expedite ultimate production of domestic and foreign freight cars. The program will not interrupt war production.

## New Warehouse Controls Are Reflecting Tight Canadian Steel Supply

#### Ottawa

• • • With Canada's war production at a new all-time peak, steel is in very short supply, and it has become necessary to tighten restrictions on the distribution of warehouse steel, C. D. Howe, Minister of Munitions and Supply, announced.

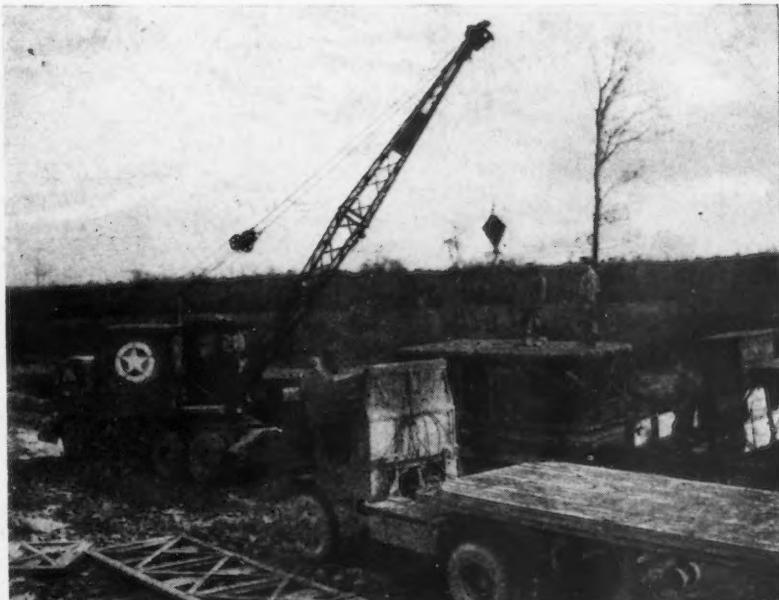
The Minister stated that a new order issued by the steel control limits the amount of steel which any consumer may buy from warehouse stocks for purposes other than war and highly essential civilian production to 10 tons of carbon steel and 2 tons of alloy steel during each calendar quarter. Any consumer who has already bought these amounts of warehouse steel for such purposes during the current quarter, will not be allowed any more until after the end of March. The order does not limit retail sales or sales between distributors.

Despite the fact that producers are heavily booked with orders extending into third quarter of this year, new buying continues at a steady pace. A large part of present bookings are associated with the big shell and munitions contracts placed with Canadian companies by the United States while at the same time production of this type of equipment for Canada and Great Britain is being maintained at a high level.

Steel production in Canada has been running well below rated capacity for the past two or three months, which is largely due to adverse weather conditions and the heavy snow accumulation which cut sharply into the movement of raw materials through lack of transportation facilities. For the past three months steel production in Canada has been running only about 87 per cent of total rated capacity, while pig iron production has been below 65 per cent. It is stated, however, that steel production schedules are beginning to move upwards and are expected to attain a rate of around 95 per cent in the immediate future.

Earlier in the year permission was granted by Wartime Prices and Trade Board for the manufacture of a number of essential civilian products, but with the growing shortage of steel on war account it is stated that any large scale output of consumer goods will be delayed until after the middle of the year, and there is doubt that much headway will be made in this direction until late in second half. However, an early settlement of the European war might change the outlook for civilian manufacturers, although it is understood that a large part of present war production is for delivery to the Eastern war theatres.

FRONT LINE ASSEMBLY: A motor vehicle assembly company in France is using a 15-ton crane to unload 5-ton semi-trailers from railroad cars.



## Japan Concentrates on Use Of Manchurian Coal and Iron Resources

### New York

• • • Although the loss of supplies from Japan's island empire brought about by the loss of the Philippines will have a damaging effect on her national economy, the most vital needs of coal and iron ore not available in her homeland will continue to be met in Manchuria.

Although China is no longer painted as the vast storehouse of undeveloped mineral riches, important mineral riches actually being extracted from the northern Chinese province make it the most important section of the territory captured since the beginning of the "incident."

Serious efforts have been made at colonization, and large scale migrations of population have indicated Japan's long range interest in the province. Most highly developed of the resources are the coal mines, used in the twenties for the South Manchurian railway. Since that time heavy industries, chemical plants and aircraft factories have for strategic, economic and social reasons been located near Mukden in the center of the coal, oil, and ore districts.

Here is found the Fushun coal mine, the largest in the world, while the over-burden and parting veins between coal seams is a high grade oil-shale. At the Fushun mine there has grown one of the largest oil-shale

enterprise and hydrogenation plants in the world. The Japanese Navy, which sponsored the Fushun shale-oil works, takes all the oil that is produced.

The Fushun mine, located 20 miles east of Mukden, covers an area of 10 miles east to west and 2½ miles north to south. The coal seam ranges in thickness from 78 to 420 ft., the average being 130 ft. The impurities of oil-shale do not exceed 20 ft. in total thickness, are mined without cost to the distillation plant, while coal fines and waste are utilized by the several hydrogenation and low-temperature processes.

The 20-ton capacity coal cars roll by gravity to the five track incline leading to the oil processing plants and the coal preparation plants. Under a Russian manager this mine produced 350 tons of coal per day for the South Manchurian Railway. In 1926 Japan put into operation a 1000 ton per hr. screening and washing plant erected by Bamag-Meguin A.G. Because of the numerous steel mills, aluminum and other metallurgical plants requiring large quantities of coal the

Fushun preparation plants have been expanded greatly during the war years.

The open cut from which huge amounts of coal are stripped increased production to 5,737,306 tons in 1926 to 8,000,000 tons in 1932, and between 10,000,000 to 12,000,000 tons in 1942.

The Fushun coal is high quality bituminous, suitable for coke ovens, locomotives and marine purposes.

Other coal deposits in the districts of Fushun, Hokang and Chalainor are estimated at from four and five times as much as those at the Fushun mine, while at Titao resources of more than 1000 million tons have been discovered. However, the total amount secreted in the vast area of 500,000 sq. miles is undetermined.

The Manchuria Coal Mining Co., which does not include the Fushun mine, produced 18 million tons of coal in 1941, which is typical of the other operating companies.

The oil industry that has been developed in connection with the Fushun mines, which consists of high and low temperature coal distillation plants and large shale-oil distillation plants. The shale-oil deposits are estimated at 5500 million tons, which approximates a 500 million ton oil reserve.

The modern town of Fushun was originally built on what is now seen as an open cut, that has now been rebuilt in another location, which together with the city of Mukden is modern in every respect with schools, hospitals and recreation centers such as one would expect to find in a new city.

• • •

THE OPEN PIT mine at Fushun, near Mukden, is said to be one of the world's largest.



# Mineral Resources in Manchoukuo

SOVIET UNION

Boundary of Countries  
Boundary of "Sheng" (Province)  
Railways

- Coal
- ★ Aluminum Shale
- Iron
- Oil Shale
- △ Zinc and Lead
- Magnesite
- ▲ Copper
- ★ Gold
- ★ Placer Gold

Names of mines printed in red letters



## Industrial Briefs . . .

• **WARD REPRESENTATIVE**—Precision Steel Warehouse, Inc., 4425 West Kinzie Street, Chicago, now represents in Illinois and Wisconsin both the mill and warehouse of Ward Steel Co., Boston.

• **ORDERS INCREASE**—Since Jan. 11, new orders placed with Chrysler Corp., have more than doubled requirements of 4.5 in. rockets. During the same time an increase of more than 80 per cent was made in orders for B-29 pressurized nose cabins, and a similar increase was made for B-29 leading wing edges.

• Other order increases include a 15 per cent jump in orders for B-29 engines produced in the Dodge Chicago plant, a 50 per cent advance in requirements for Corsair landing gears, a 10 per cent gain on tanks and a 40 per cent gain on marine engines.

• **ENLARGED PROGRAM**—Lawrence Aeronautical Corp., Linden, N. J., has taken between six and seven million dollars of new contracts for building of critical parts for Grumman Aircraft Corp., Radio Corp. of America and Mergenthaler Co.

• **RE-NAMED**—Day-Washburn Tool Co. has changed its name to the Day Co., occupying the same facilities in Chicago.

• **BUYS COMPANY**—Farrel-Birmingham Co., Inc., Ansonia, Conn., and Buffalo, N. Y., has announced the purchase of the Atwood Machine Co. of Stonington, Conn.

• **APPOINTS AGENT**—R. K. LeBlond Machine Tool Co., Cincinnati, has announced the appointment of the Ford Machinery Co., Toledo, as the agent for the complete line of LeBlond lathes, regal lathes and cutter grinders for the Toledo territory.

• **CASTINGS**—A study of gases and other factors affecting the soundness of castings made

from copper-base alloys has been instituted in the process metallurgy laboratories of Battelle Institute, Columbus, Ohio.

• **DISPOSAL CENTER**—The RFC has selected Birmingham as one of the several key disposal centers for use in clearing manufacturing equipment and materials from one type of war production to another. Materials and equipment not required for war production will be available for sale for civilian production.

• **NEW PLASTIC**—The development for the Navy of a plastic, combining the qualities of fire, plus shock-resistance and easy molding properties is announced by General Electric.

• **ALUMINUM BOX CAR**—The first of 30 specially built aluminum box cars built by Mt. Vernon Car Mfg. Co., a division of H. K. Porter Co., Inc., came off the assembly line recently. The cars were built in conjunction with Reynolds Metals Co. for use by the Rock Island Railroad, Minneapolis & St. Louis Railway Co., and the Alton Railroad.

• **POSTWAR EMPLOYMENT**—A 37 per cent increase in postwar employment among 13,630 industrial firms in New York City is indicated in a survey conducted by the Consolidated Edison Co. A total of 125,651 additional jobs after the war are indicated by these firms over their prewar employment. It was indicated that the average prewar employment per firm was 28, with an average of 34 for postwar.

• **HARNISCHFEGER WINS**—The Wisconsin Supreme Court has upheld a Milwaukee county circuit court decision in the case of alleged violation of a sales contract brought by the Schmitt Lumber Co. against the Harnischfeger Corp., Milwaukee, because Harnischfeger did not forward an inquiry involving prefabricated housing material from the government to be used for homes for shipyard workers.

## Small Businesses To Branch Out In Light Metal Fields

### Washington

• • • Declaring that it is in new uses of light metals that the real expansion is to be expected, Senator James E. Murray, Democrat of Montana, last week said that it was for this reason that the Senate Small Business Committee, which he heads, spoke of the establishing of 60,000 new enterprises in the postwar economy. The committee will begin a series of hearings on Feb. 27 on light metals. The senator said that only a sound expansion of old business and the entrance of many new ones in the field created by the light metals era ushered in by the greatly extended use of aluminum, magnesium and other metals during the war will melt needs.

To indicate where this expansion can be expected, he said that there are possibly 10,000 "war baby" industries which have developed the "know how" of using these metals.

The senator explained that correspondence he is receiving from these firms regarding postwar prospects shows their desire to turn to this knowledge, their equipment and manpower to peacetime production. Some 12,000 firms largely selling or servicing aluminum products in automotive accessories and hardware, which were forced to close their doors after Pearl Harbor, he said, will try to get back into business. It was added that a wide variety of other merchandisers, some 29,000 of them by government figures, many handling light metal products, are in this category.

To support the point that the greatest expansion will be in new uses of light metals, Senator Murray said:

"Since 1941 over 85,000 firms engaged in contract construction have discontinued. They and many others can get back into operations after the war, meeting the demand for housing and buildings only if high wartime costs are brought down.

### Rolling Mill Net Drops

#### Middletown, Ohio

• • • It is estimated that the net consolidated earnings of the American Rolling Mill Co. for 1944 after all charges, including a \$2,240,000 special contingency reserve, will be \$5,065,000. This will equal approximately \$1.05 per share of common stock after provision for preferred dividends compared to \$6,098,074, or \$1.42 per share in 1943.

## NEWS OF INDUSTRY

### Sunday Operation Of Coal Mines Forced By Steel Mill Shortages

#### Pittsburgh

• • • Severe shortages of bituminous coal for mills in the Pittsburgh, Youngstown, and Wheeling districts, have necessitated the operation of 19 river mines in western Pennsylvania on March 4, and 11. Sunday operations of these mines were scheduled for Feb. 11, and 25, but because of ice conditions in the rivers which interfered with barge navigation, the plan could not be carried out.

All mines affected are in Washington and Fayette Counties, and because of the extreme urgency of increasing coal production to maintain steel operations the plan was approved by John L. Lewis, president of the United Mine Workers of America. Double time will be paid for the Sundays during which the mines operate, as provided for in the contract for work on the seventh consecutive day.

### Steel Manpower Needs Defined by Committee

#### Washington

• • • Showing a 30,000 to 40,000 manpower shortage, the Steel Industry Advisory Committee has issued an extensive report pointing out that approximately 1,869,000 tons of ingot capacity is now not operating because of a lack of labor.

Anticipating future shortages, and using figures representing 66 per cent of total employment in the steel industry, the report said that unless 355 men are secured for coke plants, there may be a 63,000 ton loss in coke production; if 414 employees are not secured, there may be a possible loss of 50,000 tons of pig iron; if 1273 employees are not secured for open hearth, bessemer and electric furnaces, there may be a 138,000-ton ingot loss and unless 1903 workers are secured for rolling mills, there may be a possible loss of 150,000 tons of steel products.

The report indicates there is a shortage at present in addition to future needs of 12,546 men which breaks down as follows: Coke plant, 633; blast furnace, 1033; open hearth, bessemer and electric furnaces, 1425; rolling mills, 3794; and maintenance, 2815. The total manpower shortage of present and estimated future needs, is 25,472 workers. The number of requisitions on file with the United

States Employment Service as of Dec. 31, 1944, was 17,020 workers and the number of workers supplied by USES during the month of December was 7275 and the total number of workers hired from all sources during December was 9889.

### Ore Consumption Drops

#### Cleveland

• • • Consumption of Lake Superior iron ore during January was 6,766,233 gross tons by U. S. furnaces and 216,386 tons by Canadian furnaces, a total of 6,982,619 gross tons, as compared with 7,090,174 tons during December and 7,481,653 tons during January a year ago, according to report of the Lake Superior Iron Ore Association.

Ore on hand February 1 amounted to 30,888,956 gross tons, made up of 25,376,058 tons at U. S. furnaces, 4,443,554 tons on U. S. Lake Erie docks and 1,069,344 tons at Canadian furnaces. This compared with total stocks of 37,823,876 tons a month ago when U. S. furnaces and U. S. Lake Erie dock stocks were 36,088,274 tons and Canadian furnace stocks were 1,285,682 tons. On Feb. 1 a year ago total stocks were 36,059,302 tons, made up of 29,478,264 tons at U. S. furnaces, 1,267,964 tons at Canadian furnaces and 5,313,074 tons on U. S. Lake Erie docks.

There were 163 U. S. and 7 Canadian furnaces in blast Feb. 1 with 22 U. S. and 3 Canadian furnaces idle. This compares with 164 U. S. and 6 Canadian furnaces operating a month ago when 23 U. S. and 4 Canadian were out and with 175 U. S. and 7 Canadian furnaces in blast a year ago when 11 U. S. and 3 Canadian furnaces were idle.

### COMING EVENTS

April 4-6—SAE National Aerospace Meeting, New York.

April 12-14—Electrochemical Society, Inc., Philadelphia—Atlantic City Congress, Atlantic City, N. J.

#### CANCELLED

March 19-22—American Society of Tool Engineers, Cleveland.

April—American Zinc Institute, St. Louis. April 26-27—Annual Conference, Open Hearth Steel Committee and Blast Furnace and Raw Materials Committee, Iron and Steel Division, A.I.M.E., Chicago.

April 30—May 4—American Foundrymen's Association, Detroit.

May—American Gear Manufacturers Association, general meeting.

May—General Meeting, American Iron & Steel Institute, New York.

American Steel Warehouse Association, 1945 Convention, New York.

### Weirton Employees Get Pay Increase From Board's Order

#### Weirton, W. Va.

• • • The Weirton Steel Co. and the Weirton Independent Union, Inc., have signed a supplemental agreement to their wage contract which is retroactive to Dec. 1, 1943, and incorporates the Nov. 25, 1944, directive of the National War Labor Board covering wage increases in the steel industry. The supplemental agreement was signed Feb. 24, it was announced jointly by the management of the Weirton Steel Co. and the general committee of the Weirton employees' union.

All provisions of the new agreement will go into effect with the pay period beginning March 11, 1945, in the steel works, Weirton shell line and sheet mill departments; and with the pay period beginning March 18, in the tin plate, strip steel, Steubenville and Steubenville shell line departments.

Union President L. S. Lafferty said that the Weirton Independent Union, Inc., is the first union in the steel industry to complete and sign a contract under the terms of the NWLB directive. He also said that the effective date of the new wage increase giving Weirton employees retroactive pay to Dec. 1, 1943, exceeds the back pay won by all other steel industry unions.

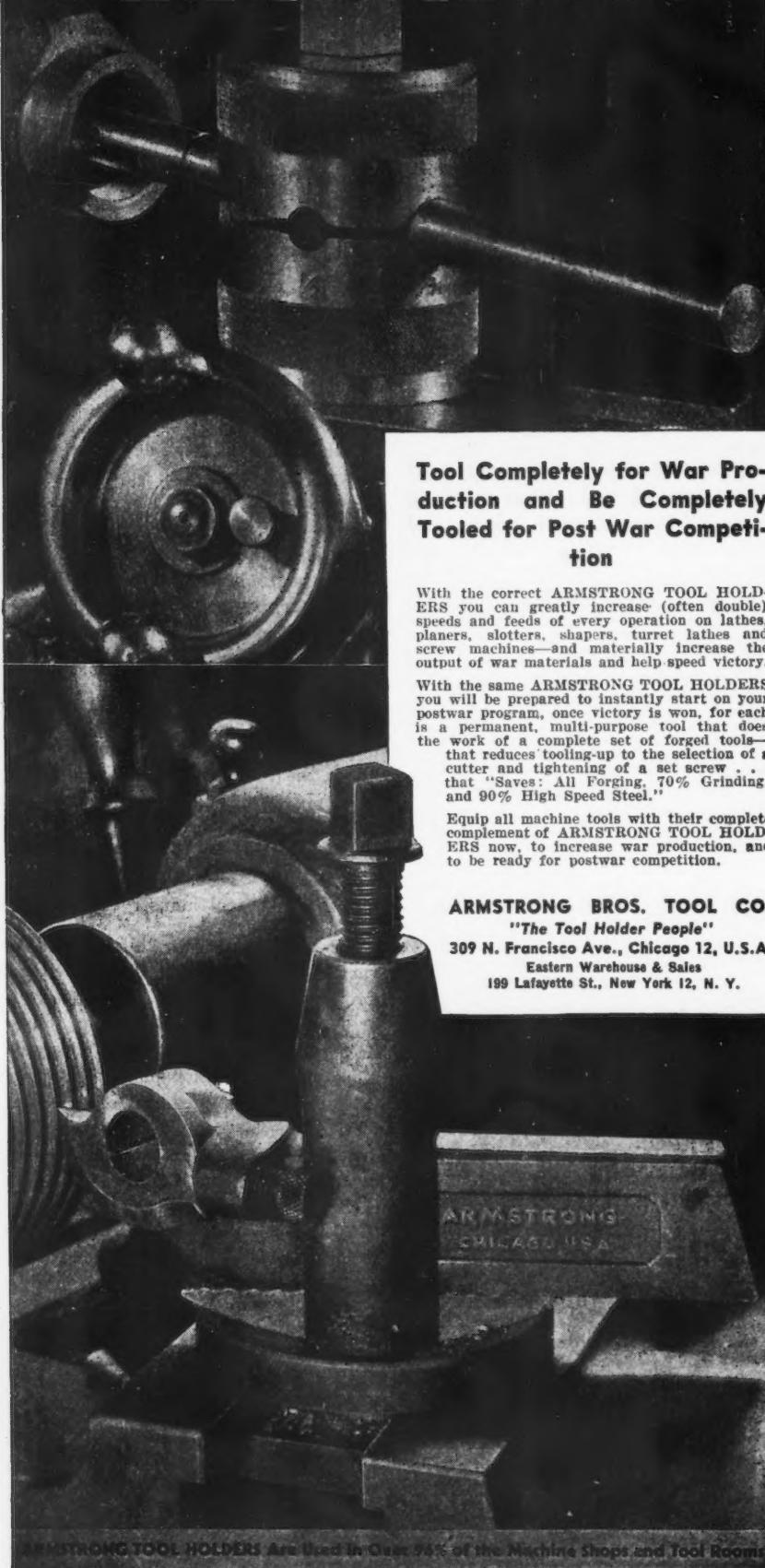
All provisions as to shift premium, vacation, overtime, etc., will be effective as of Dec. 1, 1943. Any employee or former employee, including those in service, who would have received more pay or vacation pay if the contract had been signed on Dec. 1, 1943, will receive back payment for the additional sum as soon as the payroll department of the Weirton Steel Co. can make the necessary calculations.

### Scrap Inventories Limited

#### Washington

• • • Inventories of cast iron scrap in the hands of consumers have been limited to a 60 day supply of purchased cast iron scrap based on their current melt schedules to insure an equitable distribution of available supplies, WPB announced on Feb. 27.

# ARMSTRONG



## Tool Completely for War Production and Be Completely Toolled for Post War Competition

With the correct ARMSTRONG TOOL HOLDERS you can greatly increase (often double) speeds and feeds of every operation on lathes, planers, slotters, shapers, turret lathes and screw machines—and materially increase the output of war materials and help speed victory.

With the same ARMSTRONG TOOL HOLDERS you will be prepared to instantly start on your postwar program, once victory is won, for each is a permanent, multi-purpose tool that does the work of a complete set of forged tools—that reduces tooling-up to the selection of a cutter and tightening of a set screw . . . that "Saves: All Forging, 70% Grinding, and 90% High Speed Steel."

Equip all machine tools with their complete complement of ARMSTRONG TOOL HOLDERS now, to increase war production, and to be ready for postwar competition.

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ARMSTRONG TOOL HOLDERS Are Used In Over 95% of the Machine Shops and Tool Rooms

## Job Expansion For Handicapped Goes On

### Washington

• • • Under the expanded selective placement program of the War Manpower Commission, an increase in the placement of physically handicapped workers was registered in 1944, with local offices of the United States Employment Service making nearly 300,000 placements of handicapped workers, a gain of almost 50 per cent over 1943.

Placements of physically handicapped workers during 1944 included veterans of the present war who have returned to civilian life, although there are no available figures on what percentage were veterans of this war.

Leading in the number of placements of physically handicapped workers last year was New York State with more than 57,000 placements followed by Michigan with 26,000 and Ohio with more than 23,000, WMC said.

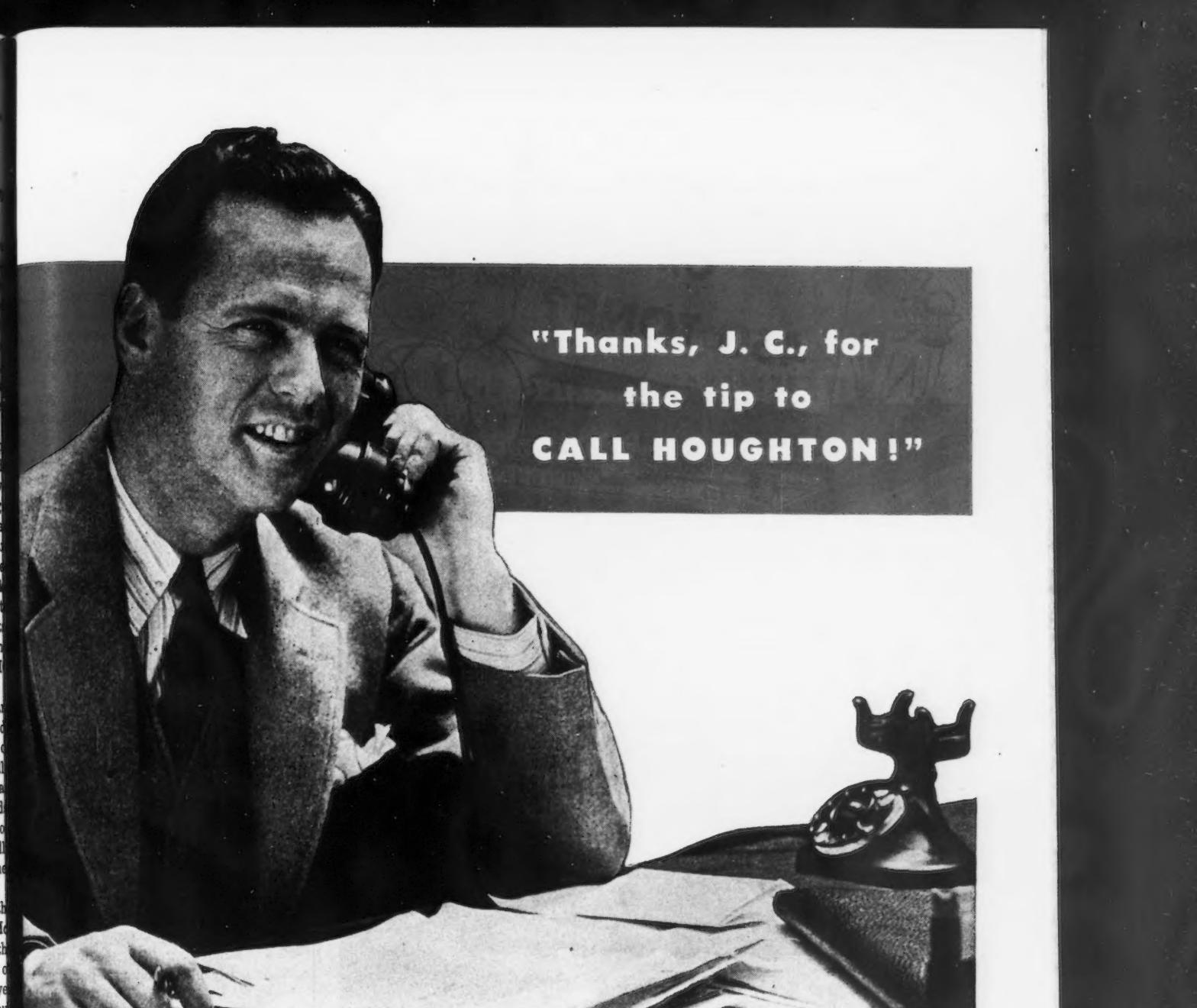
The selective placement program provides for job analysis methods which measure physical demands of jobs with the capacities of physically handicapped persons, WMC Chairman Paul V. McNutt said. In other words he added, a job analysis is made on the basis of what the physically handicapped person can do, rather than what he can't do.

The growing effectiveness of the selective placement program, Mr. McNutt said, is due in great part to the increasing cooperation and support of the program by employers. Employee institutes have been held in various parts of the country, with employer representatives of personnel and medical departments, and foremen participating in the training sessions and demonstrations of the selective placement techniques. In addition, support has been given by other government agencies including the Veterans Administration and Selective Service, and by rehabilitation agencies.

## Ford Gets New Tank Orders

### Detroit

• • • Two new orders for standardized tank engines have been received by the Ford Motor Co. One covers 1320 engines including spares for medium tanks, and the other is for 291 engines including spares, for other tanks assembled by two other companies. Ford, whose engine is now the standardized power plant for medium tanks, has built more than 17,500 units since output began.



"Thanks, J. C., for  
the tip to  
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## NEWS OF INDUSTRY

### Value of Freezing

Tools Doubted By  
A. H. d'Arcam

Newark, N. J.

• • • Field tests on taps, reamers, thread milling cutters that had subjected to sub-zero treatment indicated that not one tool had been than 10 per cent increase in tool over tools hardened in the ordinary way, according to A. H. d'Arcam vice-president, Pratt & Whitney Division, Niles-Bement-Pond Co., Hartford, in a talk last week before the Northern New Jersey Chapter of the American Society of Tool Engineers.

"A number of reputable companies have been reporting phenomenal increases in tool life, but we have been able to check these results," d'Arcam said. Freezing a speed steel tool may help if the tool is not properly drawn, but the same effect, namely transformation of normal austenite, can be obtained by double drawing at 1050 deg. F. presented recent test data obtained in his own plant that showed no increase in hardness of tools which had been deliberately been improperly hardened. Tools with low Rockwell C hardness numbers, still showed a lowing after sub-zero treatment.

On the other hand, the speaker said it is possible to increase the hardness of air hardening tool steels, like carbon, high chrome (12 per cent) from 62 to 68 R<sub>c</sub> by cooling the steel down to minus 120 deg. F. Such tools cannot be hardened by ordinary treating methods.

Similarly, d'Arcam deplored all the publicity that had been given to chromium plating of tools to increase tool life. While admitting that a flash plated tap gave three to four times the ordinary life on non-ferrous materials, he has yet to see any type of cutter on which chrome plating is really satisfactory.

Nitriding, on the other hand, consistently increased the life by 10 to 20 grinds of tools two to three times. Half the taps made today are nitrided and 75 per cent of thread making hobs. Such hobs perform better on the harder materials, and have been particularly useful for milling carbon, high chrome thread dies.

As an aside, the speaker predicted that thread rolling, which has received great impetus during the war, will be even more widely used in the

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Practical metallurgical thinking applied to our own production and consumer problems has given gratifying results. Together, these progressive activities have made a positive contribution to end-product betterment.



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Canton, Ohio*

Chicago Detroit Pittsburgh San Francisco Tacoma



## CENTERED DRIVING means faster fastening

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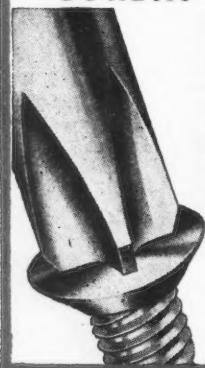
Whether you drive your screws by hand or power, use Corbin-Phillips Centered Driving for better profits!

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Also — Steel Drive Screws, Lag Screws, Cap Screws, Set Screws, Hex Semi-Finished Nuts, Machine Screw Nuts, Escutcheon Pins and Chain.

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The American Hardware Corp., Successor  
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# Screws Nuts Chain

### NEWS OF INDUSTRY

war period because of the smoother finish obtained and the greater resistance to fatigue of rolled thread products.

Speaking of tool materials, d'Ar-cambal revealed that now that restrictions have been eased on critical alloying elements, customers were once more demanding the high tungsten, 18-4-1 types of high speed steel for cutters although good results had been obtained from the molybdenum types. Ford, General Motors and Chrysler, however, seem to favor the M-2 type of molybdenum high speed steel (5 per cent Mo, 4 Cr, 1.5 V and 6 per cent W). Steel mills favor this type also because of the large amount of molybdenum present in scrap residuals and the better profit situation. Use of the moly type of H.S.S. during the critical shortage period has definitely taught tool makers the value of salt bath heat treatment of tools and these furnaces will continue in use for standard 18-4-1.

### Veterans Promised Preferred Treatment

#### Chicago

• • • Preferential treatment in employing ex-servicemen, whether or not they are former employees, has been pledged by Inland Steel Co.

Recalling that the Selective Service law requires that former employees who apply for employment within 90 days after honorable discharge shall be reinstated in the jobs they had before entering the armed services, or equivalent ones, Wilfred Sykes, Inland president, declared:

"It is not the intention of the Inland Steel Co., however, to limit its efforts on behalf of servicemen to the bare requirements of the law."

He said "it is the company's intention to study sympathetically each case so that, if possible, those who have acquired new skills will have a chance to benefit from them." Conversely, he pointed out, "those who have lost the skills they had previously acquired on the job will be afforded opportunities, so far as possible to reacquire such skills so that they may resume their former status in Inland's plant.

The degree to which the company will be able to carry out these plans, Sykes concluded, "will depend upon business conditions, but it is our intention to do all we can to the end that the serviceman shall return to his rightful place in the community, a self-respecting and self-reliant citizen."

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HEADQUARTERS**

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have proven a dependable aid in increasing the production of machine tools. Install Gusher Coolant Pumps on your bottle-neck machines **NOW**.

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### NEWS OF INDUSTRY

#### Steel Industry Pays More Than Half Cost Of Plant Expansion

##### New York

• • • Steel companies will have spent by the end of 1945 a total of more than \$1,810,000,000 of their own funds to expand and modernize their plants and properties since the beginning of the war, according to the American Iron & Steel Institute.

That total is over and above the nearly \$1,095,000,000 in government money which has been spent for steel plant expansion during the war. Thus the total cost of expansion in the steel industry during war years exceeded \$2,405,000,000—more money than the total expenditures of the United States Government in the fiscal year ending June 30, 1917.

Within a few weeks after the fall of France steel companies began to spend money to expand their facilities in anticipation of greatly increased wartime demand for special steel products. Their total expenditures during 1940 for expansion and new equipment were \$171,000,000.

In the next year, the companies' programs were stepped up sharply, and expenditures rose to \$295,000,000. About midyear 1941 the government-financed program of steel expansion began, and \$130,000,000 in government funds were spent during that year.

In 1942 and 1943, the industry spent \$265,000,000 and \$239,000,000, respectively, for expansion. Government expenditures in those years totaled \$286,000,000 and \$516,000,000. Last year steel companies spent \$136,000,000 and the government \$143,000,000.

For 1945, steel companies estimate that they will spend \$204,000,000 of their own funds. Government expenditures are expected to decline to about one-tenth the amount of the companies' expenditures, representing completion of the government-financed steel expansion program.

Actual expenditures by the steel companies in 1944 fell about 20 per cent short of the amount which they had estimated a year ago that they would spend during the year. Changes in the course of the war and inability to secure delivery of certain items of new equipment for which orders were placed are believed to be the chief reasons why actual expenditures did not come up to advance estimates.

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## SEMISILICA BRICKS

### DURATION OF HEAT AFFECTS REFRACTORIES

Following statements are based on temperature range from 2200° F to 2700° F.

#### SHORT DURATIONS OF HEAT

Furnaces with daily or shorter firing cycles usually require a good clay or super duty brick.

#### MODERATE DURATIONS OF HEAT

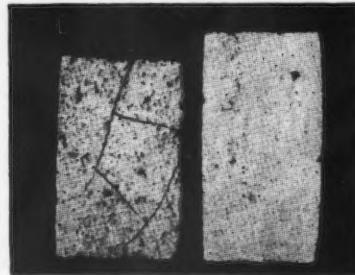
Furnaces with firing cycles of days, weeks or months require refractories which will not vitrify, shrink or spall, from the prolonged heats.

**RM SEMISILICA BRICKS.** are made for this service. The picture at the right shows the results of 24 hours at 2650° F. on a First Quality Clay Brick and the almost unaffected RM.

#### LONG DURATIONS OF HEAT

Furnaces, intended to be run continuously can safely be lined with RM SEMISILICA BRICKS, provided the face temperature of the lining is below 2700° F. While silica bricks are ideal for continuous heats, a furnace may have to be shut down, which is hard on Silica Bricks, but RM SEMISILICA BRICKS take it easily.

**Note.** Some slags and gases attack refractories, so if in doubt, please ask or write for recommendation for your furnaces.



Compression, vitrification and spalling of First Quality Clay Brick, and relatively unaffected RM Semisilica brick after a run of 24 hours under heat and load.

#### In STEEL MILLS:

For Heating, Reheating, Annealing and Heat Treating Furnaces, OH Regenerators, Blast Furnace Stoves, Soaking Pits, etc. In the roofs, where spalling failure is most prevalent, they perform their greatest service.

#### In MANY INDUSTRIES:

Such as Chemical, Ceramic, Zinc Smelting and other industries where continuous heats in the temperature range of RM's are required for their processes.

#### NEWS OF INDUSTRY

### Belgium and Luxemburg Exportation of Steel May Return Slowly

#### New York

• • • Belgium and Luxemburg's relative positions in the postwar steel export field are the subject of a recent discussion by Robert Maes, president of the export and import company bearing his name, which specializes in Belgian trade. According to Mr. Maes' statements Belgium and Luxemburg, during the war years, exported about 75 to 80 per cent of the tonnage they produced, thereby covering approximately 20 per cent of the world's foreign trade in steel products. Statistics which follow indicate that exports will continue to be the lifeblood of the Belgian and Luxemburg steel industry and are a vital factor in their bearing on ratio of production to capacity, cost of production and employment.

"As far as the steel mills are concerned their facilities and production have deteriorated, equipment is antiquated, technical progress during the war years has been at a standstill, their financial situation is poor, neighboring markets are non-existent for the time being, and overseas buyers cannot be reached for lack of shipping, postal and telegraphic communications, and the absence of a selling organization," Mr. Maes continued.

"France, which has also been one of the great steel exporting countries is not now, and will hardly be in the foreseeable future, in a better position than are Belgium and Luxemburg.

"While the war with Japan is in progress, Belgium, Luxemburg and France will gradually be rehabilitated, and during that period mills should be able to find outlets for their capacity in their domestic markets and in neighboring countries. At the same time steel mills will attempt to modernize their equipment, will adopt the new techniques, renew their contacts with overseas buyers, re-establish their selling organizations and educate themselves on world affairs with which they had lost all touch. It is quite improbable that sizeable exports for overseas markets will be possible during that period.

"At the end of the war with Japan, or soon thereafter, it can be assumed that the large steel exporting countries, that is, U.S.A., Great Britain, France, Belgium and Luxemburg, will confront each other in the world markets."

**RICHARD C. REMMEY SON CO.**  
PHILADELPHIA 37, PA.

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## of X-ray Quality Welding

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This mastery of welding technique made possible an unprecedented increase in the speed of aerial and submarine torpedo production — two of the most lethal weapons of the war at sea.

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in order to weld the high-strength alloy steel, and still meet the highest X-ray standards.

This vital wartime development is one more evidence of the supremacy of SMITHway Certified Welding Electrodes. More than 320,000 of these electrodes are used daily in A. O. Smith plants. Millions more are used in other manufacturers' plants.

Make the most of modern welding as a production tool. Write for catalog, and outline your welding problems.

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• The operation of a REEVES Variable Speed Drive is as simple as A, B, C. The operating principle and construction are readily understandable at a glance.

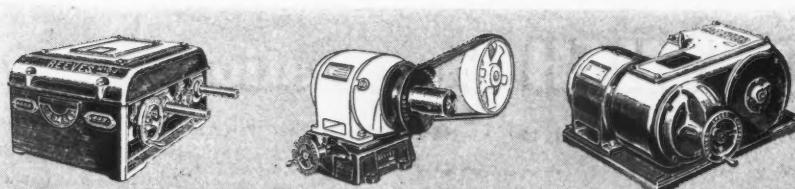
There are no delicate electrical or mechanical "gadgets" to require expert adjustment or repair—no fragile parts to break or be affected by wear. Records that REEVES Transmissions are still providing accurate speed adjustability after 40 and more years' constant service are not unusual.

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**VARIABLE SPEED TRANSMISSION**  
for providing infinite, accurate speed flexibility over wide range—2:1 to 16:1 inclusive.

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**MOTODRIVE** combines motor, speed varying mechanism and reduction gears in single unit. Speed ratios 2:1 to 6:1 inclusive.

### NEWS OF INDUSTRY

#### Steel Uses Said To Be Similar to Years Before Start of War

##### Cleveland

• • • Astonishing as it may seem, there were only a few really important changes between the uses to which our steel production was put in 1941, our last nearly complete peace year, and 1942, 1943 and 1944, three years of peak productivity for war, according to the business bulletin of Brig. Gen. Leonard P. Ayres, economist and vice-president of the Cleveland Trust Co.

Because 1941 was practically a year of peace, while the three following were high-demand war years, it is interesting to note that tools have not taken as much steel in the war years as in the peace years, ambiguous as this may seem in view of our tremendous machine tool production. General Ayres also stated that cans, mining and agriculture have taken less steel in the war years than in the peace years.

Automobiles and airplanes together took only from one-third to a little less than one-half as much steel in the war years as they did in 1941, and that great decrease resulted, of course, from virtual shutting down of the passenger automobile industry.

Exports in 1942 and 1943, the bulletin stated, took very large amounts of steel and a decreased, but still huge quantity in 1944, and that is important to the steel industry because very little exported steel ever comes back in the form of scrap.

Of the nearly 90 million tons of steel ingots produced in 1944, the fabricated steel products made from them had a total weight less than three-quarters as great as that of the original ingots.

Last year, the railroads got more steel than in the two previous years but still only about as much as their 1941 consumption. Naturally, they were not allowed to use as much as they needed, and if the wars are long protracted, that economy may prove costly, since it is not useful to expand steel production unless railroads are kept sufficiently well equipped to carry it to the places where it must be used.

There were important decreases in 1943 and 1944 in the amount of steel used in construction, because the building of most of our new war fa-

SAVING  
Old Method  
New Method  
Saving per  
Saving in  
Based on  
these ab-

### SAVINGS FROM USE OF MOTORIZED HAND TRUCKING

Old Method—Cost per Productive Standard Hour	\$ 0.074
New Method—Cost per Productive Standard Hour	\$ 0.04
Saving per Productive Standard Hour	\$ 0.034
Saving in Percent	46%
Based on 30,000 Productive Standard Hours in this Plant monthly these above savings represent	\$ 1,020.00

### LINE MATERIAL COMPANY

GENERAL OFFICES MILWAUKEE-WISCONSIN  
ELECTRICAL TRANSMISSION DISTRIBUTION AND STREET LIGHTING EQUIPMENT

Ind. Engr. Office



South Milwaukee, Wis.  
22 December 1944

Automatic Transporter Co.,  
101 West 87th St.,  
Chicago, Illinois  
Attn: Mr. J. M. Johnson

Gentlemen:

May we call your attention to an article that appeared in the latest issue of EXIDE TOPICS. On Page 8 of this issue a short resume is given of what we have been able to accomplish at our home plant here at South Milwaukee in cutting down trucking costs and trucking expense. While this article particularly emphasizes the Exide batteries, an equal amount of credit, if not more, is due to that wonderful little hand truck, the Automatic Transporter.

The 46% saving on trucking expenses shown in this article, are mainly due to the applicability of this hand truck and the efficiency of its performance which caused it to be in great demand by any of our trucking people. We have, today in our plant, six (6) such trucks in operation, when at the beginning it was felt whether or not it would be justified to spend the money for even one unit.

Some of the most important points on the Automatic Transporters are the front wheel drive which provides ample clearance under the chassis to negotiate ramps, of which our plant here has more than its goodly share. The next important point is the low maintenance cost which has as a matter of fact, been so low that we have discontinued keeping a special account for such repairs.

You certainly have a wonderful job and if there is anything we can do to help other manufacturers in the selection of their trucks or in the solving of their trucking problems, we will be glad to co-operate with you or them. As a matter of fact, if you have any chance to use the magazine article for further quotations, as far as the Line Material Company is concerned, you have our permission to use it.

Yours very truly,  
LINE MATERIAL COMPANY,  
*Geo. A. Sievers*  
Geo. A. Sievers, Ind. Engr.

GSob

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NO STRAINING • NO PULLING  
NO TUGGING • NO PUSHING

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to

## TRANSPORTER PLATFORM LIFT TRUCKS

MAKES Savings  
LIKE THIS

The 6 "Electric Propelled" TRANSPORTERS not only move more tons per trucker than was done by old types of trucking equipment, but require only one operator per TRANSPORTER. The Line Material Company, South Milwaukee, Wisconsin says their TRANSPORTERS maneuver with ease in the narrowest aisles and negotiate the steepest ramps. Materials are moved more quickly and safely between operations—workers and machinery are not held up by slow or delayed deliveries.

Write, phone, or wire for Bulletin No. 8

Breakable lightning arresters, assembled hi-tension switch parts, porcelain bodies for cutout devices, brackets, pole line hardware, heavy transformer parts, and considerable material in rough form are handled on skids through a series of manufacturing processes. Picture shows formed and galvanized metal parts being transported through the weighing operations.

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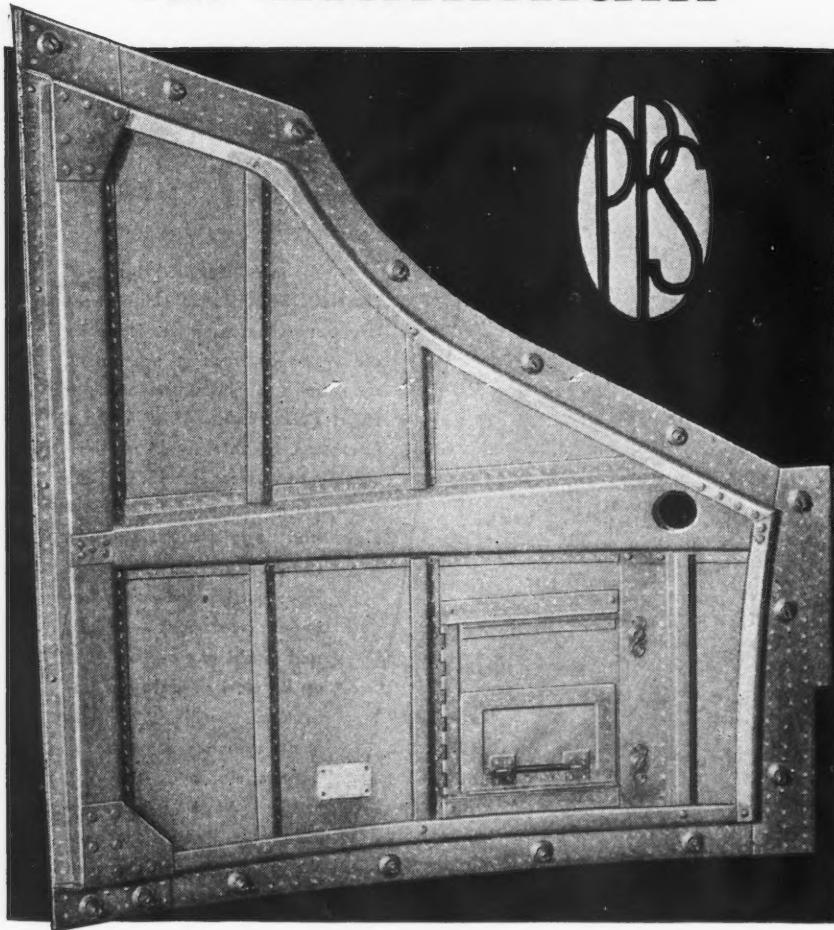
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### NEWS OF INDUSTRY

cilities has been completed. There was also a slight decrease in the large amount of steel used in shipbuilding and repair. Miscellaneous uses were greatly increased and partially reflect the tremendous output of munitions.

Industrial production, according to the index compiled by the Cleveland Trust Co., declined in volume during most of the months of last year. In October of 1943, production was 40.8 per cent above the computed normal level; by July of 1944 it had declined to 30.8 per cent above normal. It increased slightly during August and since then has fluctuated within a narrow range. December's preliminary figure is 29.6 per cent above normal.

Easily the most important single factor in bringing about a lower production level in December was the bad weather which was general in the northern and eastern states. Bituminous coal production was 11 per cent lower than it had been in November and anthracite output was 14 per cent lower. There was a sharp reduction in coke production and a commensurate decrease in the tonnages of pig iron and steel.

"Because of these decreases," General Ayres stated, "there were declines in the freight carloading of coal and coke, as there were in nearly all other classes of freight. Factory employment continues to decline, although no decrease was reported from November to December. In the final month of 1943 the index number for factory employment was 169.4 while one year later it had receded to 154.3, or a shrinkage of nine per cent."

General Ayres predicted that our military authorities will move troops as rapidly as they can from Europe to the Orient, without attempting at the start to send with them any large proportion of their stocks of reserve munitions and equipment. And while this will save time and shipping, it will have the further effect of keeping our munitions factories operating at full capacity and will enable the armed forces to retain for a longer time their controls over civilian industry.

"In economic terms," said General Ayres, "a decision to leave in Europe most of the vast stocks of military supplies we have accumulated there during the war is equivalent to a huge increase in our export trade financed with our funds."

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## NEWS OF INDUSTRY

### Detroit War Contracts

Total \$750,000,000

Since First of Year

#### Detroit

• • • War contracts approved for the Detroit area by the Production Urgency Committee of the War Production Board since the first of the year now total approximately \$750,000,000, it was made known here. Placements during the first full week of February amounted to \$136,000,000.

Other new contracts in the offing indicate that the billion dollar figure will soon be surpassed, a disproportionate figure against the \$2,815,929,928 total which required all of last year to achieve.

The largest contract not previously announced was one to Fisher Body Division of General Motors for \$70,295,000 for B-29 Superfortress parts. Hudson Motor Car Co. also was given a B-29 component order amounting to \$29,697,000. Fisher will subcontract 20 per cent of its contract, and Hudson 20 per cent.

Further expansion in the tank program was signalized by the award of a facilities expansion contract to Detroit Transmission Division of General Motors for \$5,025,000 to produce heavy tank transmission. Detroit Diesel Division of GM was given a \$6,000,000 contract continuation for medium tank engine spare parts.

The pattern of contract development in Detroit now is pointing steadfastly along two channels—bomber aircraft and tanks. Although about 40 per cent of the \$7,500,000,000 award to date thus far is concentrated on B-24 and Liberator aircraft at Willow Run, a good share of the balance now includes B-29 parts.

As for tanks, every major tank producer and supplier seems to be participating in orders obtained so far. The Detroit (Chrysler) Tank Arsenal and the Fisher Tank Arsenal both have received facilities contract to enlarge their capacities a good bit and to tool for new work, and the same goes for Cadillac, where light tanks are produced. Ford's tank engine capacity will also be stepped up.

The considerable share of remaining contracts are on ammunition and rocket programs. Awards announced in the latest WPB list in that classification include one to Bowen Product Corp., \$4,417,000, to McAleer Manufacturing Co., \$3,420,000, to Carbolo Co., Inc., \$2,893,000, and to Ferr Stamping & Manufacturing Co., \$1,225,000.

# The best way to inspect a Weld-

Ability to determine physical characteristics of a spot-weld just by "looking at it" (\*) is one result of the new welding process used by International Harvester in fabricating half-tracks at its Springfield plant.

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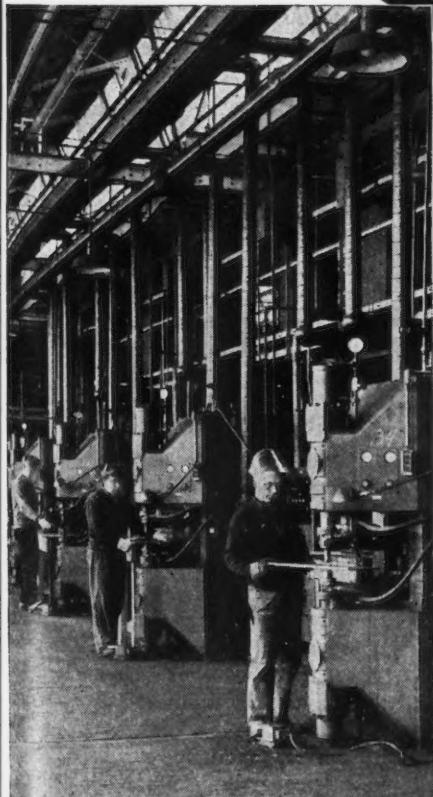
... all in one operation  
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of 200 arc welders

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Ask for Bulletin #353

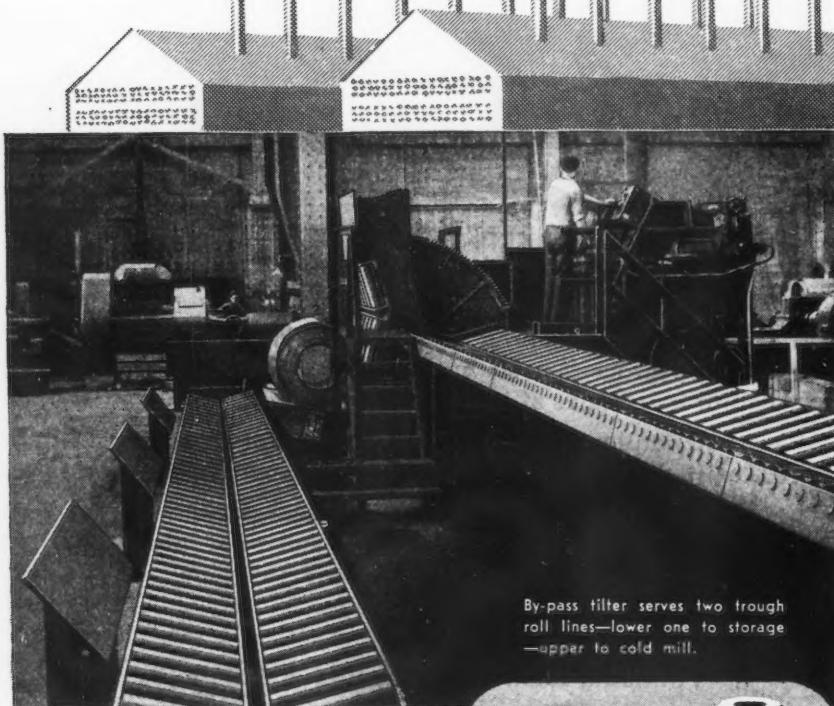
\*Hardness for instance within a couple of points Rockwell "C"

LOOK AT THE "RINGS"



**PROGRESSIVE WELDER CO**  
SEAM PROJECTION & BUTT • Electric Welding Equipment • PORTABLE GUN & PEDESTAL  
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FOR STEEL MILL SERVICE

## NEWS OF INDUSTRY

### Congress Gets 5-Yr. Resources Survey Plan From Bureau of Mine

#### Washington

• • • The Bureau of Mines sent to Congress on Feb. 8 a five-year program for investigation of raw material resources for steel production.

The proposal which involves the expenditure of \$25,000,000 originated in the office of the assistant director of the bureau, Dr. R. S. Dean, and the House "Steel Shortage" Subcommittee of the Committee on Merchant Marine and Fisheries is expected to report a bill sometime this session of Congress. Representative Frank W. Boykin of Alabama is chairman of the subcommittee.

The investigation, if authorized, will be of the following projects: Exploration of mineral deposits; demonstration plants; geophysical laboratory and shops; geophysical field work; experimental mining; and basic metallurgical investigations.

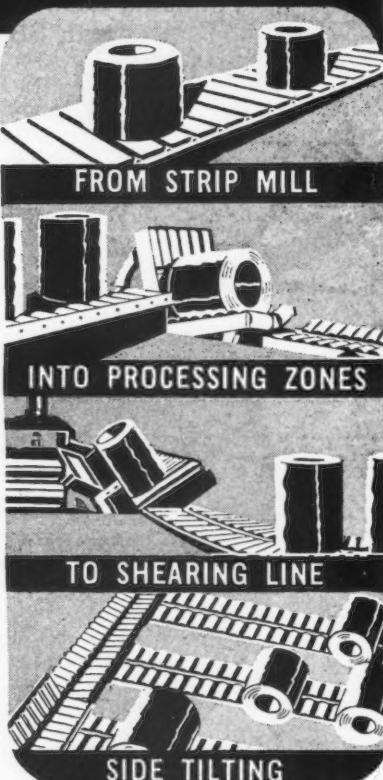
The exploration of mineral deposits is to cost \$6,000,000, and will be made to discover "whether a mining enterprise can be based on the deposit." The program says the motive for this investigation is to discover mineral resources to take the place of higher grade and more accessible deposits as they are depleted.

The bureau plans to operate demonstration plants now already authorized and to begin new ones. The cost of this operation is estimated by the bureau to be \$7,500,000. The object is to "show how domestic deposits of raw material resources for steel, including materials for plating and coating steel may be most effectively utilized," Dr. Dean said.

The program states: "Tentative plans for the five-year program of demonstration plants, necessarily subject to revision as the program develops, are as follows:

#### "PRESENT PROJECTS

"Pacific States (Shasta Dam): The demonstration plant for production of special steel from ores of that area at Redding, Calif., will be ready for operation before the end of the present fiscal year. Sponge iron and manganese for this plant have been made in bureau pilot plants. Some electrolytic chrome has been made, but the electrolytic chromium plant at Boulder City (Colo.) must be kept in operation for another year. The Redding demonstration plant has enough



Write for  
on

5-2

HIGH SP

**BACK IN '38...**

As long ago as 1938, to help conserve tungsten, Latrobe pioneered in the development of a tungsten molybdenum type high speed steel, known as **DOUBLE SIX**.

**DS**

**TODAY...**

# **LATROBE** **DOUBLE-SIX**

*...meets M-2 specifications*

Long before Hitler and his hordes over-ran the Low Countries, the war in China had cut off the supply of essential tungsten. That was back in '38, and Latrobe, realizing the urgent need for saving available tungsten, through painstaking research developed a new high speed steel, known as **DOUBLE SIX**.

Today, with only minor changes in its original analysis, **DOUBLE SIX M-2** meets the automotive industry's specifications for molybdenum-tungsten high speed steels. Born of war-time necessity, Latrobe's **DOUBLE SIX M-2** is assured a permanent place in the field of high speed steels, not only for the war emergency but for the peace-time needs to come.

Write for our latest bulletin  
on Double Six M-2

S-2

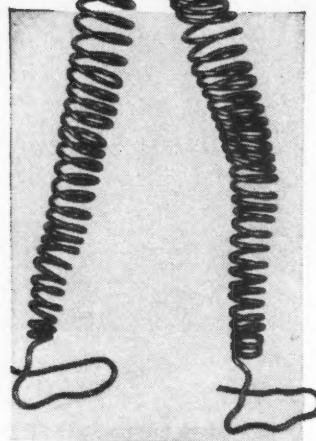
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**STILL TIGHT.** Though the nut never turned, the other parts wore and stretched. Kantlink's expanding spring action continues to hold nut securely in place.

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\*The National Lock Washer Company, Milwaukee, Wisconsin

Special Analysis Wire  
for All Industrial  
Uses



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## NEWS OF INDUSTRY

work planned for the five-year period.

**"North Central States (Rolla, Minneapolis, Grand Forks):** The plant at Rolla (Mo.) will continue its work on the recovery of nickel and cobalt from Missouri ores and on the use of high-phosphorous ores in the St. Louis steel district. These problems will require two years for solution after which other problems may be assigned to the plant.

"The basic work on sponge iron processes at Minneapolis will continue for at least another year, after which the scale of the work will require the construction of a larger plant. The work on iron ore concentration at Minneapolis has already reached the point where a demonstration plant in the Lake Superior region is required.

"The work on lignite gasification as a means of reducing iron ore, at Grand Forks (N. D.) will be completed by June 30, 1945.

**"Southeastern States (Raleigh):** The plant at Raleigh (N. C.) will continue its work on effective utilization of the iron and ferroalloy ores of the Southeast. An experimental open-hearth furnace is being installed to demonstrate how to use sponge iron most advantageously in the production of steel. Work on the manganese tungsten and vanadium ores in the area will be continued. Several years of work are ahead of this plant on the basis of the present program.

### ADDITIONAL PROJECTS

**"Sponge Iron Pilot Plant, Laramie, Wyo.:** This plant is now in operation, but is financed from a separate appropriation. For the fiscal year 1946, the Bureau of the Budget has recommended the inclusion of the project under the program for raw materials for steel production. Several years of work are ahead of this plant.

**"Lake Superior Iron Ore Concentration Plant:** It is planned to construct a demonstration plant in the Lake Superior region to show how the methods of iron ore concentration developed by the bureau can be utilized to make the vast reserves of Taconite and other low-grade ores available to the steel industry.

**"Small-Scale Work and Future Plants:** In addition to the existing and definitely planned demonstration plants, smaller scale work is necessary to proper selection of other demonstration areas. This work will lead to additional demonstration plants as required."

The program states that geophysical exploration has been applied to

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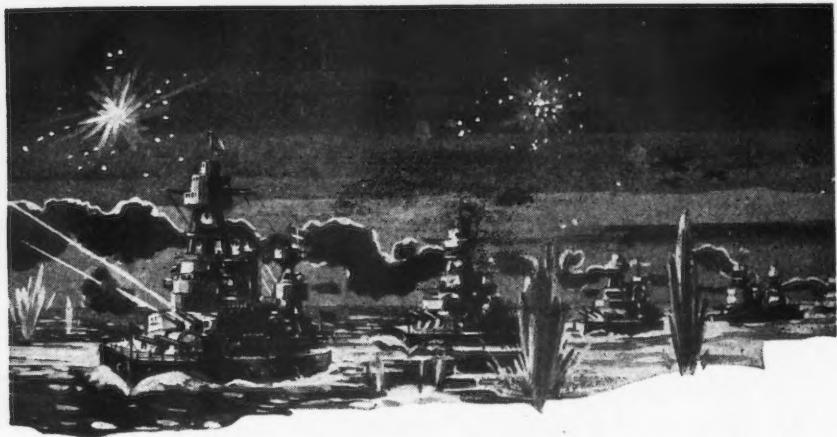
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## NEWS OF INDUSTRY

oil with great success and notes that the method is "particularly applicable to iron ores because all iron ore is more or less, magnetic and most deep-seated deposits, which are yet to be discovered, are of magnetite. The bureau plans to explore and mine 'deep-seated deposits,' and found at a depth of 'more than 1200 ft. an extensive deposit of iron ore' in Missouri.

Dr. Dean says that these deposits were so deep and the evidence, although definite, so lacking in conclusive proof of its real meaning, that no private company could be expected to spend the money necessary to determine whether this method of finding ore had proved its value.

To make the machinery for this geophysical exploration for metals, Dr. Dean would like to spend in the next five years \$1,750,000 in the construction of a geophysical laboratory and instrument making shop.

During the first year of the program, part of the funds will be used to construct or remodel a suitable building. For the second, and succeeding years, a higher percentage of the funds will be used for personnel and materials for constructing instruments.

For 28 field parties to engage in geophysical field exploration, the bureau would like to have \$5,000,000 to spend over the five-year period. The geophysical field work and interpretation would be carried on under the direction of the several geophysical divisions of the Mining Branch.

The bureau wants to spend \$4,000,000 in experimental mining "to contribute to the more efficient use of domestic deposits of raw materials for steel production by devising, improving and demonstrating methods of mining them."

How to make economical the mining of ore 1500 ft. below the surface and how to make commercially feasible the mining of "a comparatively small, medium grade tungsten deposit, 30 miles from the railroad, over difficult western terrain."

Unfortunately, Dr. Dean says of the latter case, the operation would not be economical even at present prices, but indicates that the bureau is ready to tackle the problem of reducing costs through designing more mobile equipment and suggests the utilization of small diamond drills.

Dr. Dean suggests that low-grade very deep ores could be profitably mined if hoisting equipment could be improved, and perhaps ore could be crushed underground and pumped to

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With Less than

**ARCOS Quality  
Weld Metal?**

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For fourteen years, fabricators of  
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the advantages of Arcos electrodes.

Arcos customers of 1931 are still

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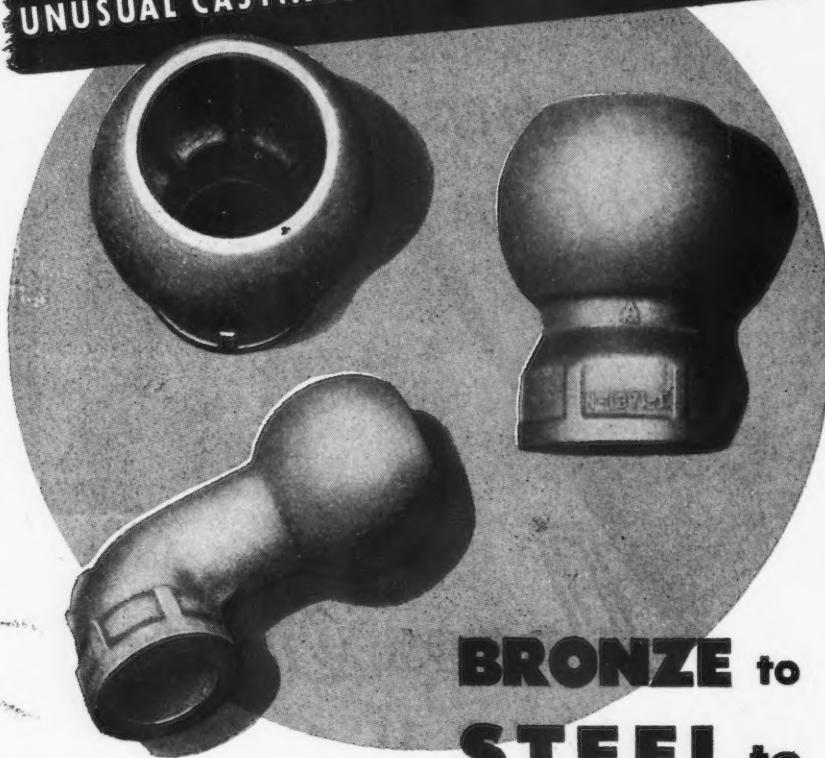
**12 ARCOS GRADES**  
for Stainless Steels  
Chrome-Nickel and Straight  
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ABSCO-MEEHANITE**

Replacing the stainless steel which had succeeded nickel bronze, these ball connections of Absco-Meehanite are serving as flexible joints in locomotive steam lines from boiler to booster engine. They are used in superheated steam service up to 250 lbs. at pressures up to 450°F. While these castings incorporate most of the properties listed below, their pressure tightness, corrosion resistance and machinability recommend them especially for this service.

**ABSCO-MEEHANITE PROPERTIES**

- 1. Strength (Shear, Compressive, Tensile and Transverse)
- 2. Impact Resistance
- 3. Corrosion Resistance
- 4. Wear Resistance
- 5. Heat Resistance
- 6. Toughness
- 7. Rigidity
- 8. Machinability
- 9. Pressure Tightness
- 10. Vibration Absorption

*Meehanite castings permit close control of physical properties for your specific application. Write for Meehanite Engineering Handbook*

AMERICAN  
**Brake Shoe**  
COMPANY

BRAKE SHOE AND  
CASTINGS DIVISION

230 Park Ave., New York 17, N. Y.

the surface, or perhaps it could be injected into a column of heavy liquid such as that used in the float-sink separation process and floated to the surface.

Only \$750,000 is wanted by the bureau for "basic metallurgical investigations."

According to Dr. Dean: "The basic metallurgical data concerning the current methods of making steel have been determined by the Bureau of Mines and other organizations over a period of years. These data are useful in determining the possibilities of new procedures in steel making. However, in the adaption of steel technology to the use of widely scattered iron ore deposits, it is necessary to have certain additional data concerning equilibria rates of reaction and thermal chemistry.

"Much costly experimentation may be saved by the determination of these data which permit the calculation of results which could otherwise be obtained only by experimentation.

"The bureau's laboratory at Berkeley, Calif., has the basic equipment and personnel to expend in order to do some of the work effectively. The Metallurgy of Steel Section of the Bureau at Pittsburgh is likewise basically equipped to carry forward this part of the work."

**Advisory Committees**

**Recognized by Agencies**

**Washington**

• • • Recognition of the war services of WPB operating groups was given last week by the Army Ordnance Department while almost simultaneously OPA was bestowing honors upon its industry advisory committees.

For "distinguished services and signal cooperation in connection with the accomplishment of the Ordnance manufacturing procurement program" the Ordnance Department conferred "Awards of Achievement" upon the WPB Minerals Division, Chemicals Bureau and Tools Division. Presentation of the awards was made by Maj. Gen. Levin H. Campbell, Jr., Chief of Ordnance, to Philip D. Wilson, vice-chairman of the Metals and Minerals Division; Dr. D. P. Morgan, Director of the Chemical Bureau and John S. Chafee, director of the Tools Division.

To OPA's Steel Castings Industry Advisory Committee at a meeting in Chicago, Price Administrator Chester Bowles presented individual certificates of award, a recognition granted

# "A.W." SUPER-DIAMOND SAFETY WITH SPEED



**PRODUCTION CALLS FOR SPEED**—To meet the demands for greater speed in production, "A.W." Rolled Steel Floor Plate offers sure traction, lasting tread and maximum safety against slipping hazards. No cracks, no ridges, no worn or slippery surfaces. Can be installed overnight. Write for catalog.

Other "A.W." products include:  
Plates, Sheets, Billets, Blooms, Slabs—Carbon, Copper or Alloy analyses.

SINCE 1826

## ALAN WOOD STEEL COMPANY

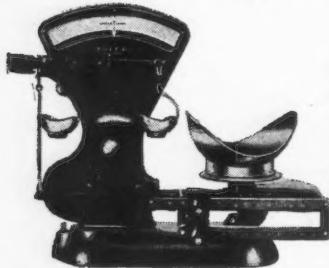
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Denver	Detroit	Houston	St. Paul	New Orleans	Pittsburgh		
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# Headquarters FOR SCALES

## PRINTED WEIGHTS

Toledo Printweigh Scales produce printed weight records in big figures at split-second speed. They eliminate human errors in recording weights that so directly affect factory costs and profit. For use with tickets, sheets, or strips. Write for Bulletin No. 032.



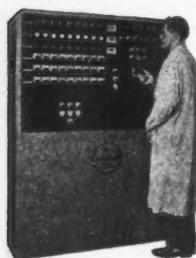
## COUNTING

For quickly and accurately issuing predetermined quantities of parts or pieces from stock; or counting unknown quantities, as in receiving or inventory. Eliminates slow, tedious hand counts. Wide choice of models... for extremely small parts, or for parts totalling several tons in weight. Write for Bulletin No. 204.

## WEIGHING... In All Capacities

*Dial Scales* For the full range of industrial requirements from Portable Scales to Motor Truck and R. R. Track Scales. Also Hopper, Tank and Overhead Track Scales. Write for Bulletin No. 020.

*Over-Under Scales* For packing, filling, and check weighing. "Speedweigh" for capacities to 5 lb., also bench and portable types for heavier requirements. Write for Bulletin No. 415.



## SPECIAL-PURPOSE SCALES

Toledos equipped with electric cut-off, can be interlocked through control panels for completely automatic batching. Automatic conveyor scales to totalize weights. Airplane weighers; dynamometer scales, etc. Toledo Scale Engineering is available for consultation on special weighing and control problems.

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## NATION-WIDE SERVICE

181 Toledo Offices conveniently located throughout United States and Canada. Service mechanics at these offices are factory-trained in the maintenance of all types of scales. Toledo Scale Company, Toledo 12, Ohio.

# TOLEDO SCALES

## NEWS OF INDUSTRY

to committees that have for two years or more performed outstanding service in "helping the economy withstand the strains of global war."

Similar awards went to the members of the Iron and Steel Scrap Industry Advisory Committee in January. These two committees, Mr. Bowles said, have done particularly worthwhile work "of great value to their country. He said that OPA has 517 industry committees with a total membership of 6643 persons.

"It seems noteworthy to me," he continued, "that this large group of business people would agree to spend much time, money and effort to help their government. When you consider what their job has been to help OPA limit the prices they can charge for the goods or services they sell in their own places of business, you appreciate more fully that they have shown real patriotism, as well as far-sighted business sense."

Mr. Bowles declared that their contribution toward improving price control has, "of course benefited their own industries and the economy of the nation as a whole."

## Pressed Metal Institute Gets Praise From Government

*Philadelphia*

• • • C. R. E. Merkle, manager, Technical Sales Development, E. I. du Pont de Nemours Co., was the principal speaker at a recent District Meeting of the Pressed Metal Institute held here recently. J. H. Robins, president, American Pulley Co., presided as chairman. More than 90 local members of the institute were present. Mr. Merkle spoke on "The Protection and Decoration of Pressed Metal with Organic Finishes," pointing out the importance of proper finish for steel stampings, the strides made in development of various new finishes, and the outlook for organic finishes on steel stampings as a means toward appearance and utility.

Oliver F. Fancey, representing the War Production Board, expressed their appreciation for the work being done by the Pressed Metal Institute and stamping manufacturers. He stated that stampings are becoming increasingly important in war materiel production and that cooperation by the industry has proven of great practical value. W. W. Galbreath, head of Stamping Section of WPB, outlined ways and means that members of the institute can secure assistance of WPB, in solving individual and industry problems.

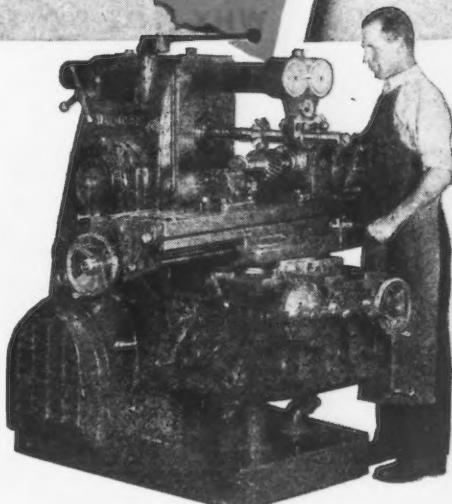
# TOUGH MILLING JOB?

A 6 lip end mill is used in this operation on a Milwaukee 2 H Milling Machine to mill a 3.750 slot in a spindle quill.

The range—power—precision of Milwaukee Milling Machines—their exceptional ability to handle a wide variety of intricate, difficult milling operations at the most effective speeds and feeds—has made them the first choice of experienced purchasers.

"Put it on a Milwaukee" and you know the job will be done right—and with the least time and trouble.

Year after year you can be sure of sustained precision performance because every Milwaukee Milling Machine—is engineered and built in proper relation to its motor power—powered!



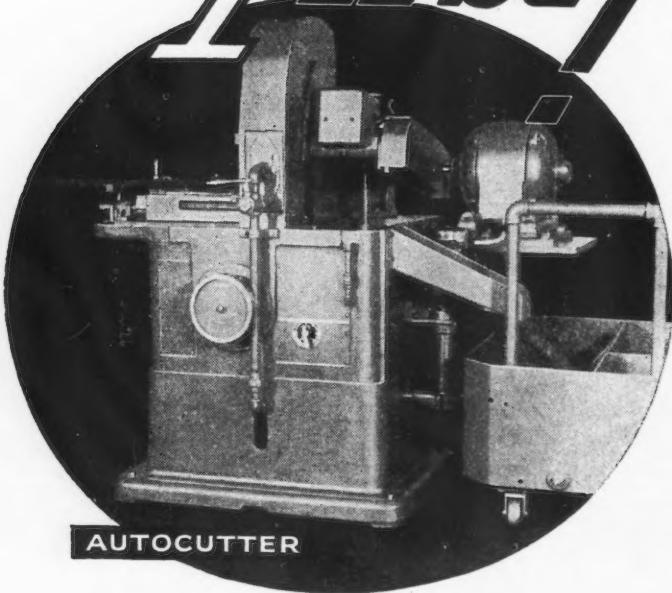
*Milwaukee Machine Tools*



**KEARNEY & TRECKER  
CORPORATION**

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IT'S A *First*



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This "700" is "first" another way. It is the opening announcement of CAMPBELL'S post-war program of development, based on wartime improvements all through the line. Other announcements will follow.

Maybe there's a way a CAMPBELL ABRASIVE CUTTER could speed up or economize your production. It's easy to find out.

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Write and tell us (1) the range of sizes, (2) kind of material, (3) length of cutoff pieces, (4) length of stock before cutting, (5) tolerance for length of cut pieces and (6) hourly production requirement. With this information, CAMPBELL engineers can recommend production procedure and work up cost sheets for you.

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ALSO MAKERS OF A COMPLETE LINE OF NIBBLING MACHINES



**AMERICAN CHAIN & CABLE COMPANY, Inc.**  
BRIDGEPORT • CONNECTICUT

#### NEWS OF INDUSTRY

#### "Mulberry" Harbors As Big as Average Natural Facility

##### New York

• • • One of the outstanding engineering feats of the present war was performed in structural steel fabrication in constructing two gigantic harbors off the coast of Normandy following D-Day in record time. Although the British structural steel industry played the principal role in this undertaking, American engineers and fabricating experience gained in American plants helped to make its achievement possible.

This mulberry was actually a 31,000 ton rampart thrown up against the waters of the English Channel and pieced together. Creation of the sunken-ship breakwater provided great protection to small-craft troop landings in the first few days of the invasion. The building of the piers circumvented the need of capturing heavily fortified port facilities.

At the end of 109 days, a total of 2,500,000 troops had been put ashore via the steel piers and in the first three months after D-Day, a total of 500,000 armed vehicles and 17,000,000 ship-tons of materials had been landed.

The development of these special prefabricated ports has been explained as follows: About 60 Liberty ships, most of them over-age, loaded with stones, were sunk approximately one mile off shore to provide a breakwater and thereby give protection to floating steel docks maneuvered closer to shore. These docks were connected with the beaches of 3300 ft. long causeways, composed of prefabricated half-through steel panel trusses. The causeways were strung together by pontoons. These connecting links provided narrow roadways over which jeeps, trucks and tanks were driven shoreward from landing crafts.

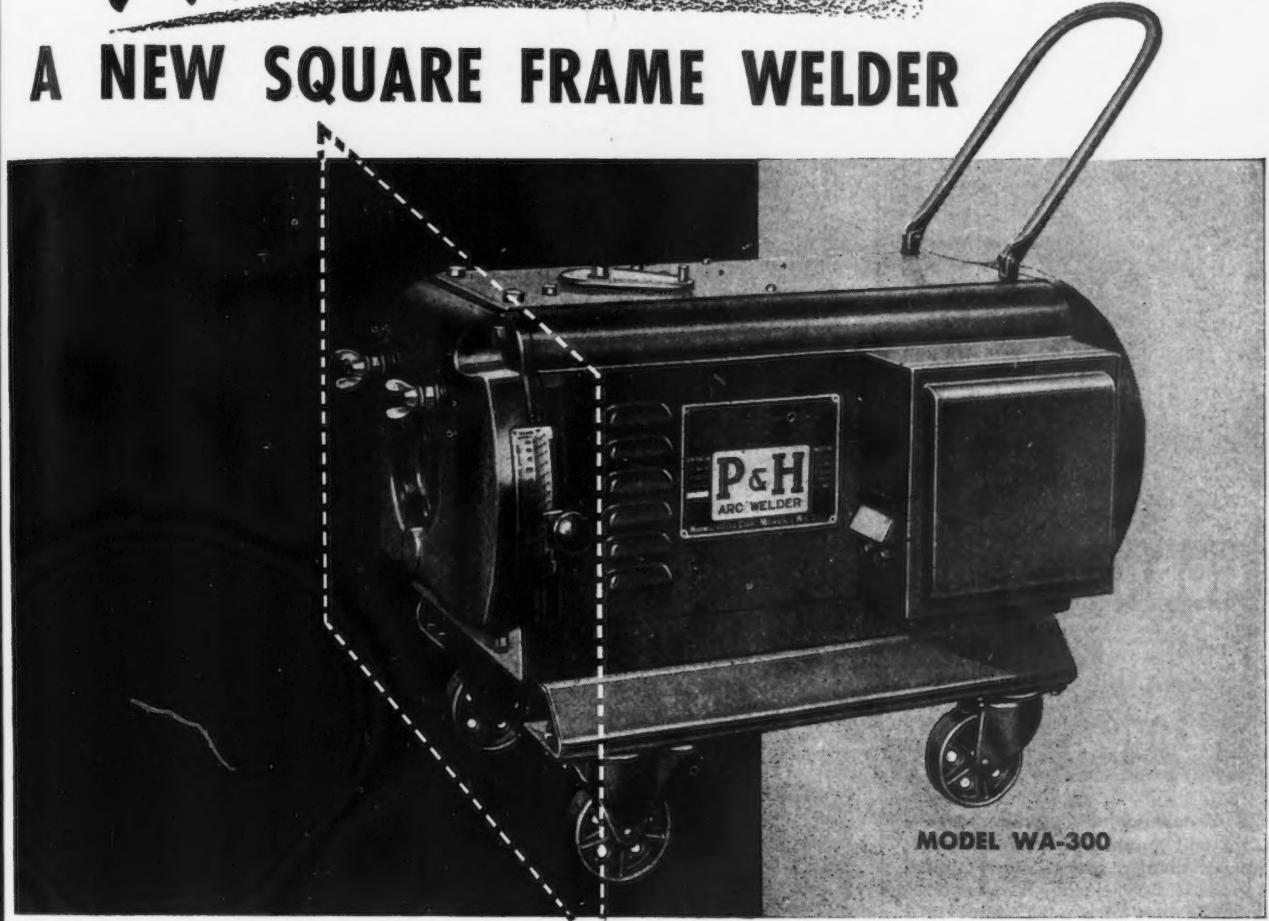
Special wharves were assembled at the end of the long piers. Seven of these specially designed wharves were prefabricated steel pontoons with a displacement of approximately 1000 tons.

Actually two giant harbors were built parallel to each other—one for the landing of British troops, and the second for American troops. The American mulberry was located off Arromanches-Les-Bains and when finally constructed, covered two miles of beach to a depth of one mile.

Prior to the D-Day invasion, Ameri-

# ANNOUNCING

## A NEW SQUARE FRAME WELDER



with WSR (WELDING SERVICE RANGE) from 60 to 375 amperes

NOW—all the unique advantages of P&H's Square Frame design (and some new ones, too!) are brought to you in a welder of larger capacity.

Here are a few important operating advantages:

- SIMPLE SQUARE FRAME DESIGN — with but two major parts.
- PARALLEL OPERATION — dual mounting of machines enables you to handle higher amperage needs.
- POLARITY REVERSING SWITCH
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A single control provides any desired welding heat within the machine's capacity. WSR (Welding Service Range) ratings give you the actual usable welding current the machine will deliver from minimum to maximum. "Visi-matic" calibration enables you to select, instantly, the right current for each of the three classes of electrodes—high, medium, or low voltage.

If your work falls within a range of 60 to 375 amperes, it will pay you to get all the facts about this new P&H Model WA-300. Write for Bulletin No. W-59.

General Offices: 4401 W. National Ave., Milwaukee 14, Wis.

### A COMPLETE ARC WELDING SERVICE



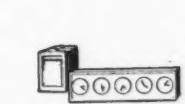
AC WELDERS



WELDING ELECTRODES



WELDING POSITIONERS



WELDING PRODUCTION CONTROL SYSTEMS



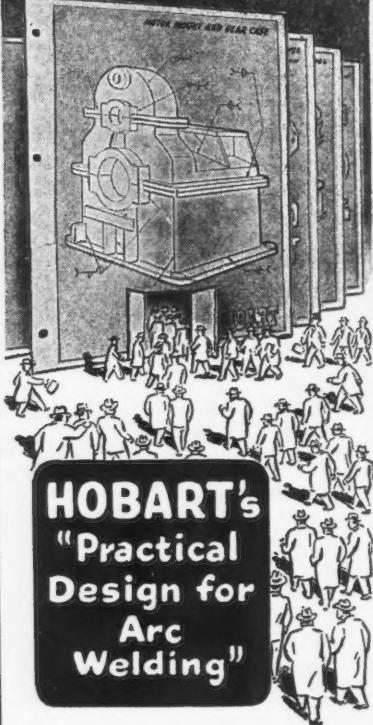
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can Seabees practiced assembling the pier in the waters adjacent to the Isle of Wight. Here they setup a 3000 ft. floating bridge and practiced unloading LST's at floating piers. In the actual crossings of the Channel, the Seabees provided the six-man crews which rode each of the assembly barges. Tugboats were used to haul

the steel girders fabricated for the job. Altogether about 20,000 ft. of floating bridge panel trusses were towed across.

When the port was finally constructed, it provided three piers, one of which was shorter than the other two. At the end of the two long piers which were parallel and of the same

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Can be Made of the  
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in all analyses for cor-  
rosion resistance, heat re-  
sistance and high strength.

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**JESSOP STEEL COMPANY**

Head Office and Mill: WASHINGTON, PENNA.



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CLUTCH HEAD Screws . . . and because the screwdriver is a universal tool . . . there need be no "stalling" in the performance of *your* product in the field. Even in the absence of an ordinary type screwdriver, a piece of flattened steel rod or any flat blade will do, the only requirement being that the blade be reasonably accurate in width. Because of the roominess of the CLUTCH HEAD recess, the thickness of the blade is a secondary consideration.

Note, if you please, that CLUTCH HEAD is the only recessed-head screw on the market that is specifically designed for screwdriver operation to eliminate field service "headaches" and, at the same time, to give you all the advantages of safer, faster, and lower-cost power driving on the assembly line with the CLUTCH HEAD Type "A" Bit.

*Personal examination will reveal to you many additional economy features incorporated in this modern screw. Ask us to mail you a package assortment of CLUTCH HEAD Screws and sample Type "A" Bit with fully illustrated Brochure.*

Production of CLUTCH HEAD Machine Screws in regular and thread-forming types is backed by the resources of this organization and by responsible Licensees.

For tool economy, compare the durability of this rugged Type "A" Bit for longer continuous service . . . also for repeated "No-cost" reconditioning to original efficiency.



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CHICAGO 8 CLEVELAND 2

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## NEWS OF INDUSTRY

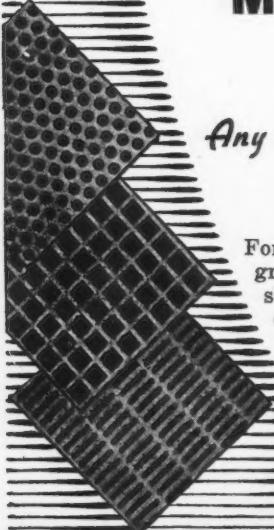
# PERFORATED METALS

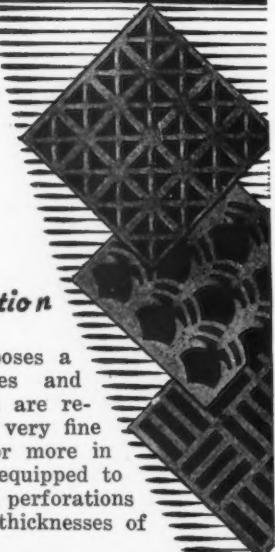
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Any Metal

Any Perforation





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length, a wharf was formed upon which ships could unload the heavy equipment. Out beyond the pierheads breakwaters were formed to keep back the unpredictable waters of the Channel and it was here that a number of the older Liberty ships were sunk to break the tides.

The most important factor in the building of the harbors was the fabrication of the piers and roadways of steel, with steel bridge panel trusses prefabricated in 80 ft. lengths. These supported and held together the entire extension of roadway from land far out into the Channel.

These steel panel trusses, the full details of which are not yet available, were similar in many respects to the ordinary bridge, but designed and coupled together in such a way as to give flexibility so that they could withstand the heaving and twisting of the sea. Each span was supported on special floats most of which were built of steel and designed to settle down on the Channel bed when the tide receded. The 80 ft. steel roadway sections were towed in tandem of six, creating a 480 ft. span, all welded together and ready to be connected to the other links in the port.

Some understanding of the size of the undertaking can be gained from the fact that each of these harbors when completed was as large as the port of Dover.

**Steel Warehouse Men  
Elect Grandy for New  
Combined Staff Post**

### Cleveland

• • • In an action combining the offices of president and executive secretary, the board of trustees of the Steel Products Warehouse Association, Inc., has announced the election of Clayton Grandy, present executive secretary, to the dual position. Prior to his installation as the executive officer of the association in 1943, Mr. Grandy completed a two-year assignment with the War Production Board as chairman of the planning committee of the Industrial Salvage Branch.

Other annual elections announced by the board include Joseph Gendelman, National Sheet Steel Co., Detroit, first vice-president; S. M. Friedman, Nottingham Steel Co., Cleveland, second vice-president; Thomas J. Reid, Century Steel Co., Chicago, secretary; and, Harry Resnick, Universal Steel Co., Cleveland, treasurer.

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THE TRUTH  
about  
Hardness Testing?



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NEWS OF INDUSTRY

**OPA Establishes New Steel Drum Industry Advisory Committee**

*Washington*

• • • Establishment of a New Steel Drum Industry Advisory Committee was announced recently by the Office of Price Administration.

The committee, composed of fourteen executives in the new steel drum, pail and container industry, held its first meeting on Feb. 19 and 20, in Washington, D. C.

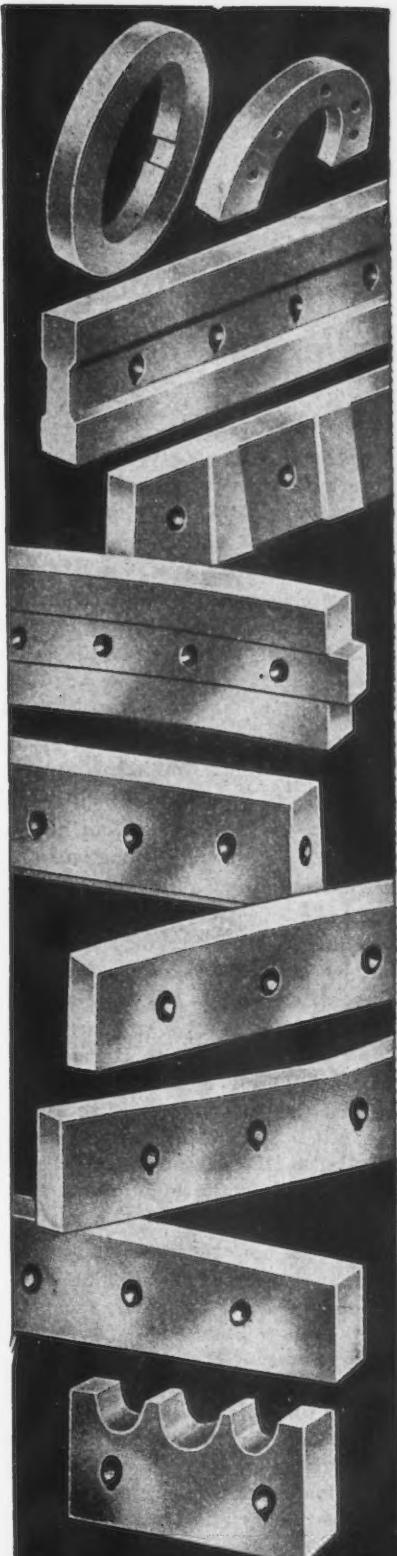
Purpose of the meeting was to discuss pricing problems in the new drum field, including the effect on manufacturing costs of the \$2 per net ton ceiling price increase for hot-rolled carbon steel sheets which became effective Jan. 11.

New steel drums, pails and steel containers are priced under the General Maximum Price Regulation, and ceilings are the highest prices individual sellers charged during March, 1942.

Members of the committee are: F. H. Alger, manager of sales, Stevens Metal Products Co., Niles, Ohio; R. L. Brammer, manager of sales, Wheeling Corrugating Co., Wheeling, W. Va.; J. A. Connelly, vice-president, U. S. Steel Products Co., Sharon, Pa.; C. B. Coons, general manager of sales, Rheem Mfg. Co., New York; Harry W. Lees, vice-president in charge of sales, J & L Steel Barrel Co., Cleveland; D. F. Manion, Jr., treasurer, Manion Steel Barrel Co., Rouseville, Pa.; J. W. McIntire, vice-president in charge of sales, Southern States Iron Roofing Co., Savannah, Ga.; Sidney Dry, vice-president, National Steel Container Co., Chicago; Paul Gaylord, manager, Virginia Barrel Co., Staten Island, N. Y.; J. T. Gossett, vice-president, Inland Steel Container Co., Chicago, Ill.; Theodore Humphrey, manager of sales, Niles Steel Products Division Republic Steel Corp., Niles, Ohio; George A. Sexton, vice-president, Sexton Can Co., Everett, Mass.; Thomas M. Stinson, manager, Steel Drum Division, National Enameling & Stamping Co., Granite City, Ill.; and H. P. Thelen, manager, Continental Can Co., New York.

**Ford to Produce New Vehicle**

• • • Ford Motor Co. will begin in July to manufacture nearly 10,000 "Weasel" amphibious cargo carriers for the Army. The specifications are similar to the M-29 Weasel originated by Studebaker and still in production by that company.



Greater Tonnage  
Per Edge of Blade



**AMERICAN  
SHEAR KNIFE CO.  
HOMESTEAD - PENNSYLVANIA**

# MACHINE TOOLS

... News and Market Activities

## Small Manufacturers Not Too Enthused About Buying DPC Tools

### Cleveland

• • • Small manufacturers, highly important vertebrae in America's economic spine, have eyed with something less than enthusiasm proposals that they turn ready cash assets into the purchase of government-owned machine tools. Faced, in the opinion of some, with a highly volatile post-war economy, these men have found more feasible the tentative plan to call in the machine tool builders and have their present equipment brought up to date as far as possible.

But in the broader aspects of the problem, the small manufacturers' circumstances probably sum up something like this: Obviously, they do not dare deplete their working capital too far, but at the same time, they are now in a position to buy durable equipment for much less than it will cost later on, and finally, if the panic, which is merely a mental projection at this time, should come, the little precaution that refraining from buying needed DPC equipment might constitute, would make no difference anyway.

There is, however, something to be said for the notion of bringing present machine tools up to date from the small shop point of view. A respectable amount of the shell-making going on in this area right now is being done on turret lathes and allied equipment made for the first world war. Furthermore, the French and British are using machine tools over a hundred years old right now.

Fortunately or unfortunately, as the case may be, everyone wants our machine tools and even as early as the summer of 1942 the Russians wanted a huge number of them for postwar use. In this regard, it is time America looked to her laurels and kept a beady eye on all foreign markets and not just the Russians. When Germany was becoming industrialized, she bought from Britain the best tools available and went to work

with them—and in 20 years the Germans had far surpassed the British, and the hum of their factories was louder than the Lion's roar.

Contrary to a lot of contemporary fiction, America could become a country surfeited with obsolescent equipment. According to reports, there are today 635,000 obsolete machine tools being used. This is not a healthy picture, and one which the expected

prosperity would find hard to frame, and from a postwar economic standpoint alone, every effort should be made to absorb the current government-owned machine tool surplus in this country.

Exporting these machine tools would not have as deleterious an effect on business as is popularly supposed, since a country that produces a lot usually needs a lot of something else according to opinion here. However, hand in glove with this is the somber question of what our foreign buyers might eventually produce, munitions for example.

## British Industry Facing Controlled Marketing Period

### New York

• • • The complete revision of existing controls on British machine tools effective Feb. 1 is, by observers in London, foreshadowing a long period of regulated business for the tool industry, made necessary by the post-war need for modernization and the market problem posed by an impending surplus.

The complete relaxation of purchase and price controls on certain tools by the British Government will have the effect of moving toward a free market condition, although the controls on some types are retained, and the right to replace all the controls now removed is specifically mentioned. By the same token, the right to remove still further of the controls is also reserved.

Worthy of note is the fact that the agency handling the tool industry throughout the war, known as Tool Control, will continue to receive complete information on the order and completion status of all tools. Thus they will be in a position to know when further control action may become essential, or less necessary.

The postwar machine tool industry will need help from its government to handle the financing of war surplus tools. While the tools themselves will be in need, both to modernize British industry and to rebuild her export

trade. If all wartime controls were relaxed, and this surplus of second hand tools were allowed to hang over the market without government action, the market fluctuations would have a detrimental effect on the industry.

The purchase of 58,000 machine tools sent from this country under the lend-lease program was a step in this direction. It is interesting to note that contrary to popular belief lend-lease tools totaled only 12½ per cent of the tooling of England's industry for war, while 14½ per cent of the tools were purchased for cash in this country. Britain's own machine tool industry furnished 73 per cent of that country's needs.

## Deliveries Extended Into July on Current Due to Heavy Backlogs

### Cincinnati

• • • The District Machine tool market is without interesting new features. Current business is at good rate, but is only piling up backlog. Present bookings indicate deliveries are now extended on current orders into July with some plants refusing deliveries. The manpower problem continues to be bothersome, although some small relief is indicated in additional applications to USES. Of course skilled men are few and far between, so that present available employees fall largely in the class requiring training.



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# NON-FERROUS METALS

... News and Market Activities

## Producers Finance Minerals Development

### New York

• • • Addressing the American Institute of Mining and Metallurgical Engineers here recently, Dr. Alan M. Bateman, director of the Metals and Minerals Division of the Foreign Economic Administration said that roughly two-thirds of our annual wartime billion dollar imports consist of metals and minerals. Despite the many problems involved in handling this volume of procurement, there have been no loans made by FEA, or RFC and its subsidiary agencies, for foreign mineral developments. Most of the foreign plant expansion required by our wartime metals and minerals needs has been provided by the producers, although in some instances advances against future de-

liveries have been made to permit development and construction. However war hazards and high shipping costs have required certain risks to be assumed by the government and most contracts were made f.o.b. foreign ports.

Wherever possible, Dr. Bateman said, it has been the policy to withdraw from government purchases and return the trade to private channels, and this has been largely or wholly arranged for foreign mercury, antimony, cobalt, tungsten, refractory chrome, vanadium, molybdenum, asbestos, industrial diamonds, columbite, rutile and zirconium compounds. Public and private purchases abroad during the war, have brought in annually over a million tons of copper, 400,000

tons of zinc and zinc in concentrates, 300,000 tons of lead and lead in concentrates, over a million tons of manganese ore, and over 3/4 million tons of chrome ore.

Dr. Bateman said that despite the volume of foreign metals and minerals required by our war production program, it had been possible to impose our ceiling prices upon foreign producers. He said that 80 per cent of our copper imports was purchased at 11.75c. per lb., and that the current average of all copper imports was 12.40c. per lb. Copper production for our needs has been considerably expanded in Canada, Chile, Peru, Mexico, Rhodesia, the Belgian Congo and South Africa. World production capacity now exceeds the probable immediate postwar requirements and normal peacetime needs.

### Copper Requirements-Supply Position, 1944-1945

Source: WPB Copper Division

Controlled Materials (Millions of Lbs.—Metal Weight)	Third Quarter			Fourth Quarter			Total Year 1944			First Quarter 1945		Second Quarter 1945		Third Quarter 1945	
	Stated Re- quire- ments(a)	Deliveries Esti- mated	Total(b)	Stated Re- quire- ments(a)	Deliveries Esti- mated	Total(b)	Stated Re- quire- ments(a)	Deliveries Esti- mated	Total(c)	Stated Re- quire- ments(a)	Deliveries Esti- mated	Stated Re- quire- ments(a)	Deliveries Esti- mated	Stated Re- quire- ments(a)	Deliveries Esti- mated
Brass Mill:															
Alloy Strip	882.4	807.0	733.3	890.1	700.0	704.6	3738.9	3329.0	3278.6	929.3	930.0*	1025.4	1020.0*	1080.9	1094.0*
Alloy Rod	314.3	248.6*	249.3	330.7	265.0	270.0	1255.4	998.6	1012.4	324.1	285.0*	347.8	300.0*	386.3	365.0*
Alloy Tube	105.5	79.0*	78.5	114.3	85.0	83.2	425.0	319.0	316.5	97.9	96.0*	107.3	103.0*	133.8	103.0*
Copper Products	126.8	102.0	88.0	123.9	100.0	97.2	524.3	388.7	373.6	129.0	105.0	124.9	105.0	122.7	105.0
Wire Mill Products	248.5	193.0*	224.9	253.9	230.0*	255.2	1045.3	818.0	910.5	289.3	235.0*	249.5	235.0*	239.4	235.0*
Foundry Products(d)	388.7	345.0	314.9	354.2	310.0	298.6	1650.0	1474.6	1442.4	359.1	338.0	347.7	315.0	309.7	290.0
Raw Materials (Thousands of Short Tons— Copper Content)	Estimate based on Stated Re- quire- ments(a)														
Demand: (Consumption)	Re- quire- ments(a)	Deliveries Esti- mated	Total(b)	Re- quire- ments(a)	Deliveries Esti- mated	Total(c)	Re- quire- ments(a)	Deliveries Esti- mated	Total(c)	Re- quire- ments(a)	Deliveries Esti- mated	Re- quire- ments(a)	Deliveries Esti- mated	Re- quire- ments(a)	Deliveries Esti- mated
Refined Copper:															
Brass Mills	307.2	265.9	237.9	313.7	247.3	232.0	1277.9	1082.7	1039.8	310.9	297.0	337.1	321.0	362.0	350.0
Wire Mills	132.9	103.3	120.2	135.8	123.1	137.2	542.9	425.9	486.5	154.8	126.0	133.5	126.0	128.1	126.0
Foundries(e)	33.3	30.0	20.3	30.0	22.3	16.9	125.7	108.7	88.7	21.5	20.0	20.9	19.0	19.0	17.0
Non-C.M.P.	12.5	12.5	9.3	11.5	11.5	17.6	55.6	55.6	64.9	12.0	12.0	18.0	18.0	18.0	18.0
Total Refined Copper Demand	485.9	411.7	387.7	491.0	404.2	403.7	2002.1	1672.9	1679.9	499.2	455.0	509.5	484.0	527.7	511.0
Scrap:															
Brass Mills	224.8	194.3	192.9	229.1	180.6	196.8	935.5	789.8	812.8	236.8	227.0	256.9	244.0	275.8	267.0
Foundries(e)	134.5	118.9	120.8	123.6	117.2	120.7	581.2	528.1	552.0	140.0	132.0	135.6	123.0	120.8	113.0
Non-C.M.P.	6.0	6.0	7.0	7.5	7.5	11.2	28.5	28.5	29.8	12.0	12.0	11.0	11.0	11.0	11.0
Total Scrap Demand	365.3	319.2	320.7	360.2	305.3	328.7	1545.2	1346.4	1394.6	388.8	371.0	403.5	378.0	407.6	391.0
Total Demand	851.2	730.9	708.4	851.2	709.5	732.4	3547.3	3019.3	3074.5	888.0	826.0	913.0	862.0	935.3	902.0
Supply:															
Total Refined Copper Production	422.0	422.0	447.5	428.0	428.0	452.2	1771.0	1771.0	1803.4	494.0	494.0	494.0	494.0	494.0	494.0
Brass Mill Scrap Receipts	224.8	194.3	181.1	226.1	180.6	176.6	935.5	789.8	759.5	236.8	227.0	256.9	244.0	275.8	267.0
Other Scrap Receipts	135.0	132.0	136.9	152.3	133.3	150.2	605.3	577.3	625.4	147.2	139.0	142.6	129.0	127.0	119.0
Total Scrap Receipts	359.8	326.3	318.0	381.4	313.9	326.8	1540.8	1367.1	1384.9	384.0	366.0	399.5	373.0	402.8	386.0
Total Supply	781.8	748.3	765.5	809.4	741.9	779.0	3311.8	3138.1	3188.3	878.0	860.0	893.5	867.0	896.8	880.0
Surplus or Deficit:															
Refined Copper	63.9†	10.3	59.8	63.0†	23.8	48.5	231.1†	98.1	123.5	5.2†	39.0	15.5†	10.0	33.7†	17.0†
Scrap	5.5†	7.1	2.7†	21.2	8.6	1.9†	4.4†	20.7	9.7†	4.8†	5.0†	4.0†	5.0†	4.8†	5.0†
Total Surplus or Deficit	69.4†	17.4	57.1	41.8†	32.4	46.6	235.5†	118.8	113.8	10.0†	34.0	19.5†	5.0	38.5†	22.0†

(a) Represents requirements as submitted and revised by claimants. (b) Final (includes all adjustments due to late reports). (c) Preliminary (subject to minor revisions). (d) Excludes railroad journal bearings and engine castings produced from railroad scrap in third and fourth quarters, and production of Navy Yards and Naval Supply Depots in fourth quarter. (e) Includes raw material for ingot used in the production of foundry C.M.P. products. \* Represents maximum possible deliveries as limited by manpower and facilities. † Deficit. Excludes prospective requirements for Russian Lend-Lease and Liberated countries which are not yet firm.

## NON-FERROUS METALS PRICES

### Primary Metals

(Cents per lb., unless otherwise noted)

Aluminum, 99+%	15.00
10,000 lb.	15.00
Antimony, American, Laredo, Tex.	14.50
Beryllium copper, 3.75-4.25% Be; dollars per lb. contained Be	\$17.00
Cadmium, del'd	90.00
Cobalt, 97-99% (per lb.)	\$1.50 to \$1.57
Copper, electro, Conn. valley	12.00
Copper, electro, New York	11.75
Copper, lake	12.00
Gold, U. S. Treas., dollars per oz.	\$35.00
Iridium, 99.5%, dollars per troy oz.	\$4.50
Iridium, dollars per troy oz.	\$120.00
Lead, St. Louis	6.35
Lead, New York	6.50
Magnesium, 99.9 + %, carlots	20.50
Magnesium, 12-in. sticks, carlots	27.50
Mercury, dollars per 76-lb. flask, f.o.b. New York	\$165.00 to \$168.00
Nickel, electro	35.00
Palladium, dollars per troy oz.	\$24.00
Platinum, dollars per oz.	\$35.00
Silver, open market, New York, cents per oz.	44.75
Tin, Straits, New York	52.00
Zinc, East St. Louis	8.25
Zinc, New York	8.65

### Remelted Metals

(Cents per lb. unless otherwise noted)

Aluminum, No. 12 Fdy. (No. 2)	9.00 to 10.00
Aluminum, deoxidizing	
No. 2, 3, 4	\$6.00 to 9.50
Brass Ingot	
85-5-5 (No. 115)	13.25
88-10-2 (No. 215)	16.75
80-10-10 (No. 305)	16.00
No. 1 Yellow (No. 405)	10.25

### Copper, Copper Base Alloys

(Mill base, cents per lb.)

Extruded	
Shapes	Rods
Copper	20.87
Copper, H.R.	17.37
Copper drawn	18.37
Low brass, 80%	20.40
High brass	19.48
Red brass, 85%	20.61
Naval brass	20.37
Brass, free cut	15.01
Commercial bronze, 90%	21.32
Commercial bronze, 95%	21.53
Manganese bronze	24.00
Phos. bronze, A, B, 5%	36.50
Muntz metal	20.12
Everdur, Herculoy, Olympic or equal	25.50
Nickel silver, 5%	28.75
Architect bronze	19.12

### Aluminum

(Cents per lb., subject to extras on gage, size, temper, finish, factor number, etc.)

Tubing: 2 in. O.D. x 0.065 in. wall 2S, 40c. (1/2H); 52S, 61c. (O); 24S, 67 1/2c. (T).

Plate: 0.250 in. and heavier; 2S and 3S, 21.2c.; 52s, 24.2c.; 61S, 22.8c.; 24S, 24.2c.

Flat Sheet: 0.188 in. thickness; 2S and 3S, 22.7c. a lb.; 52S, 26.2c.; 61S, 24.7c.; 24S, 26.7c.

2000-lb. base for tubing; 30,000-lb. base for plate, flat stock.

Extruded Shapes: "As extruded" temper: 2000-lb. base, 2S and 3S, factor No. 1 to 4, 25.5c.; 14S, factor No. 1 to 4, 35c.; 17S, factor No. 1 to 4, 31c.; 24S, factor No. 1 to 4, 34c.; 53S, factor No. 1 to 4, 28c.; 61S, factor No. 1 to 4, 28 1/2c.

The factor is determined by dividing perimeter of shape by weight per lineal foot.

Wire Rod and Bar: Base price; 17ST and 11ST-3, screw machine stock. Rounds: 1/4 in., 28 1/2c. per lb.; 1/2 in., 26c.; 1 in., 24 1/2c.; 2 in., 23c. Hexagons: 1/4 in., 34 1/2c. per lb.; 1/2 in., 28 1/2c.; 1 in., 25 1/2c.; 2 in., 25 1/2c. 2S, as fabricated, random or standard lengths, 1/4 in., 24c. per lb.; 1/2 in., 25c.; 1 in., 24c.; 2 in.,

23c. 24ST, rectangles and squares, random or standard lengths. 0.093-0.187 in. thick by 1.001-2.000 in. wide, 33c. per lb.; 0.751-1.500 in. thick by 2.001-4.000 in. wide, 29c.; 1.501-2.000 in. thick by 4.001-6.000 in. wide, 27 1/2c.

### Magnesium

Sheet, rod, tubes, bars, extruded shapes subject to individual quotations. Metal turnings: 100 lb. or more, 46c. a lb.; 25 to 90 lb., 56c.; less than 25 lb., 66c.

## NON-FERROUS SCRAP METAL QUOTATIONS

†(OPA basic maximum prices, cents per lb., f.o.b. point of shipment, subject to quality, quantity and special preparation premiums—other prices are current quotations)

### Copper, Copper Base Alloys

#### OPA Group 1†

No. 1 wire, No. 1 heavy copper	9.75
No. 1 tinned copper wire, No. 1 tinned heavy copper	9.75
No. 2 wire, mixed heavy copper	8.75
Copper tuyeres	8.75
Light copper	7.75
Copper borings	9.75
No. 2 copper borings	8.75
Lead covered copper wire, cable	6.00*
Lead covered telephone, power cable	6.04
Insulated copper	5.10*

#### OPA Group 2†

Bell metal	15.50
High grade bronze gears	13.25
High grade bronze solids	11.50*
Low lead bronze borings	11.50*
Babbitt lined brass bushings	13.00
High lead bronze solids	10.00*
High lead bronze borings	10.00*
Red trolley wheels	10.75
Tinny (phosphor bronze) borings	10.50
Tinny (phosphor bronze) solids	10.50
Copper-nickel solids and borings	9.25
Bronze paper mill wire cloth	9.50
Aluminum bronze solids	9.00
Soft red brass (No. 1 composition)	9.00
Soft red brass borings (No. 1)	9.00
Gilding metal turnings	8.50
Contaminated gilded metal solids	8.50
Unlined standard red car boxes	8.25
Lined standard red car boxes	7.75
Cocks and faucets	7.75
Mixed brass screens	7.75
Red brass breakage	7.50
Old nickel silver solids, borings	6.25
Copper lead solids, borings	6.25
Yellow brass castings	6.25
Automobile radiators	7.00
Zinc bronze borings	8.00
Zinc bronze solids	8.00

#### OPA Group 3†

Fired rifle shells	8.25
Brass pipe	7.50
Old rolled brass	7.00
Admiralty condenser tubes	7.50
Muntz metal condenser tubes	7.00
Plated brass sheet, pipe reflectors	6.50
Manganese bronze solids	7.35*
Manganese bronze solids	6.25*
Manganese bronze borings	6.50*
Manganese bronze borings	5.50*

#### OPA Group 4†

Refinery brass	4.75*
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\*Price varies with analysis. <sup>1</sup>Lead content 0.00 to 0.40 per cent. <sup>2</sup>Lead content 0.41 to 1.00 per cent.

## ELECTROPLATING ANODES AND CHEMICALS

### Anodes

(Cents per lb., f.o.b. shipping point)

Copper: Cast, elliptical, 15 in. and longer	25 1/2%
Electrolytic, full size	22%
cut to size	30%
Rolled, oval, straight, 15 in. and longer	23 1/4%
Curved	24 1/4%
Brass Cast, 82-20, elliptical, 15 in. and longer	23%
Zinc: Cast, 99.99, 16 in. and over	16 1/2%
Nickel: 99% plus, cast	47
Rolled, depolarized	48
Silver: Rolled, 999 fine per Troy (1-9) oz., per oz.	58

### Chemicals

(Cents per lb., delivery from New York)

Copper cyanide, tech., 100-lb. bbls. 1-5	5.65
Copper sulphate, 99.5 crystals, bbls.	13.00-13.50
Nickel salts, single, 425-lb. bbls.	34.00
Silver cyanide, 100 oz. lots	40.82-41.125
Sodium cyanide, 96% dom., 100-lb. dms.	0.15
Zinc, cyanide, 100-lb. dms.	33.00
Zinc, sulphate, 89% crystals, bbls.	6.80

## Stocks Down; WMC Rules Labor Critical

• • • Scrap stocks at plants of consumers, suppliers and producers approximated 5,335,000 gross tons at the end of December, according to the Bureau of Mines. This inventory, the lowest in two years, was the result of almost constant decreases during the year for a total drop in inventory of more than a million tons from Jan. 1, 1944. Over 600,000 tons of this loss occurred during the last three months of the year. Consumers' stocks at the end of 1944 were 3,951,000 tons, a drop of 326,000 tons from the previous month. During that period, combined stocks of suppliers and producers increased by 37,000 tons to a total of 1,384,000 tons. The drop in stocks of purchased scrap held by consumers during the month amounted to 259,000 tons and was the major factor in the current loss in total inventories, although a reduction of home scrap to the extent of 67,000 tons contributed its effect.

Collection and distribution of iron and steel scrap have again been placed

in the "critical" category by the War Manpower Commission, and the United States Employment Service is being advised by WMC to give scrap yards preferred treatment of available referrals of manpower.

In some regions, scrap dealers are being asked to advise the salvage division of WPB whenever immediate referrals for key employees, such as crane operators or foremen, are not forthcoming or if adequate referrals for other jobs do not appear from USES within two weeks.

Scrap dealers hailed the return to the "critical" category as a move which might be of great importance in helping them solve manpower problems. Scrap yards throughout the country, particularly in the Midwest where so much scrap is produced, have complained constantly since the war began of the inadequacy of available help due to comparatively low wage scales and comparatively disagreeable work.

**PITTSBURGH**—Scrap is moving a little better because the weather has improved. The car situation is still very tight. Manpower in yards is very scarce, and this factor alone has had a depressing effect on movement. Machine shop turnings prices dropped another 25c. to \$13.50-\$14.00, which was reflected in other turnings grades.

**CHICAGO** — Absence of mill buying leaves the district market substantially unchanged from last week. Restricted mill purchase of machine shop turnings of specified source last week at \$9.50 has not been followed by open market buying and a somewhat weaker figure is indicated for this grade. On the other hand, top quality electric furnace open hearth and foundry scrap of industrial origin remains firm at ceiling. Blast furnace grades are finding no market and heavy production points to a weak but nominal price level. No. 2 heavy melting steel is being carefully watched for possible weakness.

**DETROIT**—With automotive lists closing here this week, no changes were registered in the market. Inventories are creeping up a bit in some yards but not significantly, caused in part by continued but improving manpower situations and in some cases by inability to get cars for shipment. Good demand exists for certain grades of turnings being utilized

in place of much wanted open hearth steel.

**PHILADELPHIA** — Scrap supplies are steadily deteriorating. Mill inventories are dangerously low and many fear operational slowdowns if shipments do not improve in the next two weeks. The greatest problem facing the scrap yards this week is in getting freight cars to move prepared scrap. However, once the railroad problem is out of the way, the old problem of manpower shortages will probably again become the No. 1 headache. The War Manpower Commission has tried to minimize this difficulty by correcting its essential industry list to include scrap yard operations. The dearth of cast grades has been particularly hard on foundries here. Although they are willing to pay to move cast from long distances, it has been of no avail.

**CLEVELAND** — There are no price changes this week but the acute shortage of cars is a major source of difficulty around here. A lot of cars are supposed to be tied up in the East and the problem of manpower is still acute.

**BUFFALO**—Turnings continue the soft spot in an otherwise firm scrap market. Deliveries of this plentiful war plant by

product currently represent more than 60 per cent of the tonnage on old contracts. With many of these running out, the leading consumer has indicated \$13 a ton as its figure for machine shop turnings in new contracts, which is \$1.25 below the last previous purchases. Heavier grades of scrap are tight. One mill bought several thousand tons last week at the full OPA maximum with brokerage fee, confirming prices at this end of the list for the time.

**BOSTON**—Not much scrap was moved during the past week because of snow and ice, but the little that did went to eastern Pennsylvania and local foundries with shipments to the latter predominating. Foundries are in urgent need of scrap. Instances are cited where they have offered to furnish labor to dig scrap out of yard piles. However, conditions have improved somewhat since Washington's birthday and better business is anticipated. The market for turnings continues weak, but is not actually lower.

**NEW YORK**—Movement of scrap continues slow, hampered by lack of labor and railroad facilities. It is reported that mills urgently need deliveries and are requesting prompt action on outstanding orders, hence prices of all grades hold firm at ceilings. The shortage of rail cars is apparently not uniform throughout the district since certain dealers report cars available this week.

**ST. LOUIS**—Cold weather and heavy snows continue to slow down the movement of scrap iron to the St. Louis industrial district, yards here being unable to operate more than two days last week. The present week opened with sleet and a drop in temperature of 40 deg. Mills are losing ground on inventories of scrap. All maritime and railroad material is being allocated to consumers.

**BIRMINGHAM**—The larger mills in this market still are showing little interest in obtaining open hearth grades although no price decline for scrap generally is reported. More interest is being shown by foundries for cast grades following the pig iron advance of \$1 per ton. There is a strong demand for rails of rerolling quality.

**CINCINNATI**—Some activity is noted in the market largely as the result of an easing in severe weather conditions, but prices remain unchanged. Borings and turnings continue weak with good cast scrap still scarce. Yard interests indicate that the labor problem continues to cramp efficient operation and that this is in some part restricting a freer flow of material. A modest improvement in the supply of rails is noted for the time being, but good low phos scrap is fairly scarce.

Go  
for  
bro

Per gross ton  
No. 1 hvy. m  
No. 2 hvy. m  
RR. scrap r  
Rails 3 ft. a  
No. 1 comp'd  
Hand bld. n  
Hvy. axle tu  
Mach. shop  
Short shov.  
Mixed bor. a  
Cast iron b  
Hvy. break.  
No. 1 cupola  
RR. knuck. a  
RR. coil sp  
Rail leaf sp  
Rolled steel  
Low phos. b  
Low phos. b  
RR. malleable

Per gross ton  
No. 1 hvy.  
No. 2 hvy.  
No. 1 bundle  
No. 2 dealer  
Galv. bundle  
Mach. shop  
Short shov.  
Cast iron b  
Mix. borings  
Low phos. h  
Low phos. h  
No. 1 RR b  
Boroll 3 ft. a  
Locomotive  
Cut bolsters  
frames  
Angles & sp  
St'dard stl. a  
No. 3 steel  
Couples &  
Agricul. ma  
RR. malleable  
No. 1 mach  
No. 1 agric  
Hvy. break  
RR. grate  
Cast iron b  
Stove plate  
Clean auto  
Cast iron c

Per gross ton  
No. 1 hvy.  
No. 2 hvy.  
No. 1 bund  
No. 2 bund  
Mach. shop  
Shoveling t  
Cast iron b  
Mixed bor.  
Low phos.  
No. 1 cupo  
Hvy. break  
Stove plate  
Scrap rails

Dealers' bu  
No. 1 hvy.  
No. 2 hvy.  
No. 1 and  
Busheling  
Turnings, s  
Machine sh  
Mixed bor  
C'l'n cast  
Truck  
Machinery  
Breakable  
Stove plat

## IRON AND STEEL SCRAP PRICES

Going prices as obtained in the trade by IRON AGE editors, based on representative tonnages (for ceiling prices see O. P. A. schedule No. 4). Where ceiling prices are quoted they do not include brokerage fee or adjusted transportation charges. Asterisks indicate grades selling at ceilings.

### PITTSBURGH

Per gross ton delivered to consumer:	
No. 1 hvy. melting.	\$20.00*
RR. hvy. melting...	21.00*
No. 2 hvy. melting...	20.00*
RR. scrap rails...	21.50*
Rails 3 ft. and under	23.50*
No. 1 comp'd sheets	20.00*
Hand bldd. new shts	20.00*
Hvy. axle turn...	19.50*
Hvy. steel forge turn...	19.50*
Mach. shop turn... \$13.50 to 14.00	
Short shov. turn...	15.50 to 16.00
Mixed bor. and turn.	15.00 to 15.50
Cast iron borings...	15.50 to 16.00
Hvy. break. cast...	16.50*
No. 1 cupola...	20.00*
RR. knuck. and coup...	24.50*
RR. coil springs...	24.50*
Rail leaf springs...	24.50*
Rolled steel wheels...	24.50*
Low phos. bil. crops	25.00*
Low phos...	22.50*
RR. malleable	22.00*

### CHICAGO

Per gross ton delivered to consumer:	
No. 1 hvy. melting.	\$18.75*
No. 2 hvy. melting.	18.75*
No. 1 bundles.	18.75*
No. 2 dealers' bndls.	\$16.25 to 16.75
Galv. bundles	14.25 to 14.75
Mach. shop turn...	8.50 to 9.00
Short shovel. turn...	9.25 to 9.75
Cast iron borings...	9.25 to 9.75
Mix. borings & turn...	9.25 to 9.75
Low phos. hvy. forge	23.75*
Low phos. plates...	21.25*
No. 1 RR. hvy. melt.	19.75*
Reroll. rails	22.25*
Miscellaneous rails.	20.25*
Rails 3 ft. and under	22.25*
Locomotive tires, cut	24.25*
Cut bolsters & side	
frames	22.25*
Angles & splice bars	22.25*
St'dard stl. car axles	25.75*
No. 3 steel wheels.	22.75 to 23.25
Couplers & knuckles	23.25*
Agricul. malleable..	22.00*
RR. malleable	22.00*
No. 1 mach. cast...	20.00*
No. 1 agricul. cast...	20.00*
Hvy. breakable cast	16.50*
RR. grate bars...	15.25*
Cast iron brake sh's	15.25*
Stove plate	19.00*
Clean auto cast...	20.00*
Cast iron carwheels	20.00*

### CINCINNATI

Per gross ton delivered to consumer:	
No. 1 hvy. melting.	\$19.50*
No. 2 hvy. melting.	19.50*
No. 1 bundles.	19.50*
No. 2 bundles.	19.50*
Mach. shop turn... \$8.50 to 9.00	
Shoveling turn...	16.50*
Cast iron borings...	8.50 to 9.50
Mixed bor. & turn...	8.50 to 9.50
Low phos. plate...	22.00*
No. 1 cupola cast...	20.00*
Hvy. breakable cast	16.50*
Stove plate	19.00*
Scrap rails	21.50*

### BOSTON

Dealers' buying prices per gross ton, f.o.b. cars	
No. 1 hvy. melting.	\$15.05*
No. 2 hvy. melting...	15.05*
No. 1 and 2 bundles	15.05*
Busheling	15.05*
Turnings, shoveling	\$11.00 to 11.06
Machine shop turn...	9.00 to 9.06
Mixed bor. & turn...	9.00 to 9.06
Clin. cast, chem. bor.	13.06 to 14.15*
Truck delivery to foundry	
Machinery cast	21.00 to 23.51*
Breakable cast	21.57 to 21.87*
Stove plate	20.00 to 23.51*

### DETROIT

Per gross ton, brokers' buying prices:	
No. 1 hvy. melting.	\$17.32*
No. 2 hvy. melting.	17.32*
No. 1 bundles.	17.32*
New busheling	17.32*
Flashings	17.32*
Mach. shop turn...	\$8.50 to 9.00
Short shov. turn...	11.00 to 11.50
Cast iron borings...	10.00 to 10.50
Mixed bor. & turn...	8.50 to 9.00
Low phos. plate...	19.82*
No. 1 cupola cast...	20.00*
Charging box cast...	18.00 to 19.00
Hvy. breakable cast	16.50*
Stove plate	18.50 to 19.00
Automotive cast ...	20.00*

### PHILADELPHIA

Per gross ton delivered to consumer:	
No. 1 hvy. melting.	\$18.75*
No. 2 hvy. melting.	18.75*
No. 2 bundles	18.75*
Mach. shop turn...	13.75*
Shoveling turn...	15.75*
Cast iron borings...	14.75*
Mixed bor. & turn...	13.75*
No. 1 cupola cast...	20.00*
Hvy. breakable cast	16.50*
Cast, charging box	19.00*
Hvy. axle, forge turn	18.25*
Low phos. plate...	21.25*
Low phos. punchings	21.25*
Billet crops	21.25*
RR. steel wheels...	23.25*
RR. coil springs...	23.25*
RR. malleable	22.00*

### ST. LOUIS

Per gross ton delivered to consumer:	
Heavy melting	\$17.50*
Bundled sheets	17.50*
Mach. shop turn...	\$8.00 to 8.50
Hvy. axle turn...	16.75
Locomotive tires, un-cut	20.00
Misc. std. sec. rails.	19.00*
Rerolling rails	21.00*
Steel angle bars	21.00*
Rails 3 ft. and under	21.50*
RR. springs	22.00*
Steel car axles	23.50*
Stove plate	19.00*
Grate bars	15.25*
Brake shoes	15.25*
RR. malleable	22.00*
Cast iron carwheels	18.50*
No. 1 mach'ry cast	20.00*
Breakable cast	16.50*

### BIRMINGHAM

Per gross ton delivered to consumer:	
No. 1 hvy. melting.	\$17.00*
No. 2 hvy. melting.	17.00*
No. 1 busheling	17.00*
Long turnings	\$9.50 to 10.00
Cast iron borings...	9.50 to 10.00
Bar crops and plate	19.50*
Structural and plate	19.50*
No. 1 cast	20.00*
Stove plate	17.00
Steel axles	18.00*
Scrap rails	18.50
Rerolling rails	20.50*
Angles & splice bars	20.50*
Rails 3 ft. & under	21.00*
Cast iron carwheels	16.50 to 17.00

### YOUNGSTOWN

Per gross ton delivered to consumer:	
No. 1 hvy. melting.	\$20.00*
No. 2 hvy. melting.	20.00*
Low phos. plate...	22.50*
No. 1 busheling	20.00*
Hydraulic bundles...	20.00*
Mach. shop turn...	\$13.00 to 13.50
Short shovel. turn...	15.00 to 15.50
Cast iron borings...	14.00 to 14.50

### NEW YORK

Dealers' buying prices, per gross ton, on cars	
No. 1 hvy. melting.	\$15.32*
No. 2 hvy. melting.	15.33*
Comp. black bundles	15.33*
Comp. galv. bundles	12.32*
Mach. shop turn...	10.32*
Mixed bor. & turn...	10.32*
No. 1 cupola cast...	20.00*
Hvy. breakable cast	16.50*
Charging box cast...	19.00*
Stove plate	19.00*
Clean auto cast...	20.00*
Unstrip. motor blks.	17.50*
Clin. chem. cast bor.	14.33*

### BUFFALO

Per gross ton delivered to consumer:	
No. 1 hvy. melting.	\$19.35*
No. 1 bundles	19.25*
No. 2 bundles	19.25*
Mach. shop turn...	13.00
Shoveling turn...	16.25*
Cast iron borings...	15.25*
Mixed bor. & turn...	14.25*
No. 1 cupola cast...	20.00*
Stove plate	19.00*
Low phos. plate...	21.75*
Scrap rails	20.75*
Rails 3 ft. & under	22.75*
RR. steel wheels...	23.75*
Cast iron car wheels	20.00*
RR. coil & leaf sprgs.	23.75*
RR. knuckles & coup.	23.75*
RR. malleable	22.00*
No. 1 busheling	19.25*

### CLEVELAND

Per gross ton delivered to consumer:	
No. 1 hvy. melting.	\$19.50*
No. 2 hvy. melting.	19.50*
Compressed sheet stl.	19.50*
Drop forge flashings	19.00*
No. 2 bundles	19.50*
Mach. shop turn...	\$12.50 to 13.00
Short shovel.	14.50 to 15.00
No. 1 busheling	19.50*
Steel axle turn...	19.00*
Low phos. billet and bloom crops	23.66*
Cast iron borings...	13.50 to 14.00
Mixed bor. & turn...	12.50 to 13.00
No. 2 busheling	17.00
No. 1 machine cast	20.00*
Railroad cast	20.00*
Railroad grate bars	15.25*
Stove plate	19.00*
RR. hvy. melting	20.50*
Rails 3 ft. & under	23.00*
Rails 18 in. & under	24.25*
Rails for rerolling...	23.00*
Railroad malleable	22.00*
Elec. furnace punch	22.00*

### SAN FRANCISCO

Per gross ton delivered to consumer:	
RR. hvy. melting	\$15.50 to \$16.25
No. 1 hvy. melting	15.50 to 16.25
No. 2 hvy. melting	14.50 to 15.25
No. 2 bales	13.50 to 14.25
No. 3 bales	9.50 to 10.50
Mach. shop turn...	7.00
Elec. furn. 1 ft. und.	15.50 to 17.00
No. 1 cupola cast	19.00 to 21.00

### LOS ANGELES

Per gross ton delivered to consumer:	
No. 1 hvy. melting	\$14.00 to \$15.00
No. 2 hvy. melting	13.00 to 14.00
No. 2 bales	12.00 to 13.00
No. 3 bales	9.00 to 10.00
Mach. shop turn...	4.50
No. 1 cupola cast	19.00 to 21.00

### SEATTLE

Per gross ton delivered to consumer:	
RR. hvy. melting	\$13.50
No. 1 hvy. melting	13.50
No. 3 bundles	11.50
Elec. furn. 1 ft. und.	\$16.00 to 17.00
No. 1 cupola cast	20.00*

# Comparison of Prices . . .

Advances Over Past Week in Heavy Type; Declines in *Italics*. Prices are F.O.P. Major Basing Points. The various basing points for finished and semi-finished steel are listed in the detailed price tables, pages 141-148.

Flat Rolled Steel:	Feb. 27, Feb. 20, Jan. 23, Feb. 29,	(Cents Per Lb.)	1945	1945	1945	1944
Hot rolled sheets*	2.10	2.10	2.10	2.10		
Cold rolled sheets	3.05	3.05	3.05	3.05		
Galvanized sheets (24 ga.)*	3.50	3.50	3.50	3.50		
Hot rolled strip	2.10	2.10	2.10	2.10		
Cold rolled strip	2.80	2.80	2.80	2.80		
Plates*	2.10	2.10	2.10	2.10		
Plates, wrought iron	3.80	3.80	3.80	3.80		
Stain's c.r. strip (No. 302)	28.00	28.00	28.00	28.00		

Tin and Terne Plate:	Feb. 27, Feb. 20, Jan. 23, Feb. 29,	(Dollars Per Base Box)	1945	1945	1945	1944
Tin plate, standard cokes	\$5.00	\$5.00	\$5.00	\$5.00		
Tin plate, electrolytic	4.50	4.50	4.50	4.50		
Special coated mfg. terne	4.30	4.30	4.30	4.30		

Bars and Shapes:	Feb. 27, Feb. 20, Jan. 23, Feb. 29,	(Cents Per Lb.)	1945	1945	1945	1945
Merchant bars	2.15	2.15	2.15	2.15		
Cold finished bars	2.65	2.65	2.65	2.65		
Alloy bars	2.70	2.70	2.70	2.70		
Structural shapes	2.10	2.10	2.10	2.10		
Stainless bars (No. 302)	24.00	24.00	24.00	24.00		
Wrought iron bars	4.40	4.40	4.40	4.40		

Wire and Wire Products:	Feb. 27, Feb. 20, Jan. 23, Feb. 29,	(Cents Per Lb.)	1945	1945	1945	1945
Plain wire	2.60	2.60	2.60	2.60		
Wire nails*	2.55	2.55	2.55	2.55		

Rails:	Feb. 27, Feb. 20, Jan. 23, Feb. 29,	(Dollars Per Gross Ton)	1945	1945	1945	1945
Heavy rails*	\$40.00	\$40.00	\$40.00	\$40.00		
Light rails*	40.00	40.00	40.00	40.00		

Semi-Finished Steel:	Feb. 27, Feb. 20, Jan. 23, Feb. 29,	(Dollars Per Gross Ton)	1945	1945	1945	1945
Rerolling billets	\$34.00	\$34.00	\$34.00	\$34.00		
Sheet bars	34.00	34.00	34.00	34.00		
Slabs, rerolling	34.00	34.00	34.00	34.00		
Forging billets	40.00	40.00	40.00	40.00		
Alloy blooms, billets, slabs	54.00	54.00	54.00	54.00		

Wire Rods and Skelp:	Feb. 27, Feb. 20, Jan. 23, Feb. 29,	(Cents Per Lb.)	1945	1945	1945	1945
Wire rods	2.00	2.00	2.00	2.00		
Skelp	1.90	1.90	1.90	1.90		

\* For interim increase on delivered price granted by OPA as of Jan. 11, 1945, see detailed price tables.

## Composite Prices . . .

FINISHED STEEL	February 27, 1945	2.25839c. a Lb.	2.25839c. a Lb.	2.25839c. a Lb.	2.25839c. a Lb.	2.27235c. a Lb.
One week ago	2.25839c.	2.25839c.	2.25839c.	2.25839c.	2.25839c.	2.27235c.
One month ago	2.25839c.	2.25839c.	2.25839c.	2.25839c.	2.25839c.	2.27235c.
One year ago	2.25839c.	2.25839c.	2.25839c.	2.25839c.	2.25839c.	2.27235c.

HIGH	LOW	HIGH	LOW	HIGH	LOW
1945..... 2.25839c., Jan. 16	2.21189c., Jan. 2	\$24.61, Feb. 20	\$23.61, Jan. 2	\$19.17	\$19.17
1944..... 2.30837c., Sept. 5	2.21189c., Oct. 5	\$23.61	\$23.61	19.17	19.17
1943..... 2.25513c.	2.25513c.	23.61	23.61	19.17	19.17
1942..... 2.26190c.	2.26190c.	23.61	23.61	19.17	19.17
1941..... 2.43078c.	2.43078c.	\$23.61, Mar. 20	\$23.45, Jan. 2	\$22.00, Jan. 7	\$19.17, Apr. 10
1940..... 2.30467c., Jan. 2	2.24107c., Apr. 16	23.45, Dec. 23	22.61, Jan. 2	21.83, Dec. 30	16.04, Apr. 9
1939..... 2.35367c., Jan. 3	2.26689c., May 16	22.61, Sept. 19	20.61, Sept. 12	22.50, Oct. 3	14.08, May 16
1938..... 2.58414c., Jan. 4	2.27207c., Oct. 18	23.25, June 21	19.61, July 6	15.00, Nov. 22	11.00, June 7
1937..... 2.58414c., Mar. 9	2.32263c., Jan. 4	23.25, Mar. 9	20.25, Feb. 16	21.92, Mar. 30	12.67, June 8
1936..... 2.32263c., Dec. 28	2.05200c., Mar. 10	19.74, Nov. 24	18.73, Aug. 11	17.75, Dec. 21	12.67, June 9
1935..... 2.07642c., Oct. 1	2.06492c., Jan. 8	18.84, Nov. 5	17.83, May 14	13.42, Dec. 10	10.33, Apr. 29
1934..... 2.15367c., Apr. 24	1.95757c., Jan. 2	17.90, May 1	16.90, Jan. 27	18.00, Mar. 13	9.50, Sept. 25
1933..... 1.95578c., Oct. 3	1.75836c., May 2	16.90, Dec. 5	13.56, Jan. 3	12.25, Aug. 8	6.75, Jan. 3
1932..... 1.89196c., July 5	1.83901c., Mar. 1	14.81, Jan. 5	13.56, Dec. 6	8.50, Jan. 12	6.43, July 5
1931..... 1.99626c., Jan. 13	1.86586c., Dec. 29	15.90, Jan. 6	14.79, Dec. 15	11.33, Jan. 6	8.50, Dec. 29
1930..... 2.25488c., Jan. 7	1.97319c., Dec. 9	18.21, Jan. 7	15.90, Dec. 16	15.00, Feb. 18	11.25, Dec. 9
1929..... 2.31773c., May 28	2.26498c., Oct. 29	18.71, May 14	18.21, Dec. 17	17.58, Jan. 29	14.08, Dec. 3

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing 78 per cent of the United States output. Index recapitulated in Aug. 28, 1941, issue.

Pig Iron:	Feb. 27, Feb. 20, Jan. 23, Feb. 29,	(Per Gross Ton)	1945	1945	1945	1944
No. 2 fdy., Philadelphia	\$26.84	\$26.84	\$25.84	\$25.84		
No. 2, Valley furnace	25.00	25.00	24.00	24.00		
No. 2, Southern Cin'ti	26.11	26.11	25.11	23.94		
No. 2, Birmingham	21.38	21.38	20.38	20.38		
No. 2, foundry, Chicago†	25.00	25.00	24.00	24.00		
Basic, del'd eastern Pa.	26.34	26.34	25.34	25.34		
Basic, Valley furnace	24.50	24.50	23.50	23.50		
Malleable, Chicago†	25.00	25.00	24.00	24.00		
Malleable, Valley	25.00	25.00	24.00	24.00		
L. S. charcoal, Chicago	37.34	37.34	37.34	37.34		
Ferromanganese†	135.00	135.00	135.00	135.00		

† The switching charge for delivery to foundries in the Chicago district is 60c. per ton.  
† For carlots at seaboard.

Scrap:	(Per Gross Ton)	1945	1945	1945	1945
Heavy melt'g steel, P'gh.	\$20.00	\$20.00	\$20.00	\$20.00	
Heavy melt'g steel, Phila.	18.75	18.75	18.75	18.75	
Heavy melt'g steel, Ch'go	18.75	18.75	18.75	18.75	
No. 1 hy. comp. sheet, Det.	17.32	17.32	17.32	17.32	
Low phos. plate, Youngs'n	22.50	22.50	22.50	22.50	
No. 1 cast, Pittsburgh	20.00	20.00	20.00	20.00	
No. 1 cast, Philadelphia	20.00	20.00	20.00	20.00	
No. 1 cast, Chicago	20.00	20.00	20.00	20.00	

Non-Ferrous Metals:	(Cents Per Lb. to Large Buyers)	1945	1945	1945	1945
Copper, electro., Conn.	12.00	12.00	12.00	12.00	
Copper, Lake	12.00	12.00	12.00	12.00	
Tin (Straits), New York	52.00	52.00	52.00	52.00	
Zinc, East St. Louis	8.25	8.25	8.25	8.25	
Lead, St. Louis	6.35	6.35	6.35	6.35	
Aluminum, Virgin, del'd.	15.00	15.00	15.00	15.00	
Nickel, electrolytic	35.00	35.00	35.00	35.00	
Magnesium, ingot	20.50	20.50	20.50	20.50	
Antimony, Laredo, Tex.	14.50	14.50	14.50	14.50	

PIPING	SCRAP STEEL
Steel pipe	\$19.17 a Gross Ton
Cast iron pipe	\$19.17 a Gross Ton
Sheet & plate	\$19.17 a Gross Ton
Cooperage	\$19.17 a Gross Ton
Commodities	\$19.17 a Gross Ton

STEEL	reflect 3%
Widths up to 20,000 ft.	straight line
(18) Portion	interim increase
(18) Add in length	length
Basic	basic
SHEETS	sheets
Hot rolled	hot rolled
Cold rolled	cold rolled
Galvanized	galvanized
Enameling	enameling
Long term	long term
STRIP	strip
Hot rolled	hot rolled
Cold rolled	cold rolled
Cooperage	cooperage
Commodities	commodities
TIN PLATE	tin plate
Standard	standard
Electro. b.	electro. b.
BLACK PLATE	black plate
29 gauge	29 gauge
TERNES, R.	ternes, r.
Special co.	special co.
BARS	bars
Carbon steel	carbon steel
Rail steel	rail steel
Reinforcing	reinforcing
Reinforcing	reinforcing
Cold finished	cold finished
Alloy, hot	alloy, hot
Alloy, cold	alloy, cold

# ... Prices of Finished Iron and Steel

Steel prices shown here are f.o.b. basing points, in cents per lb. unless otherwise indicated. Extras apply. Delivered prices do not reflect 3% tax on freight. (1) Mill run sheet, 10c. per 100 lb. under base; primes, 25c. above base. (2) Unassorted 8-lb. coating. (3) Widths up to 12-in. (4) 0.25 carbon and less. (5) Applied to certain width and length limitations. (6) For merchant trade. (7) For straight length material only from producer to consumer. Discount of 25c. per 100 lb. to fabricators. (8) Also shafting. For quantities of 20,000 to 29,999 lb. (9) Carload lot in manufacturing trade. (10) Prices do not apply if rail and water is not used. (11) Boxed. (12) Portland and Seattle price, San Francisco 2.50c. (14) This base price for annealed, bright finish wires, commercial spring wire. (15) Add 10c. per 100 lb. to delivered price—OPA interim increase, Jan. 11, 1945. (16) Add 15c. per 100 lb. to delivered price—OPA interim increase, Jan. 11, 1945. (17) Add 10c. per 100 lb. to delivered price of plates produced to sheared mill or universal mill width and length tolerances—OPA interim increase, Jan. 11, 1945.

Basing Point ↓ Product	Pitts- burgh	DELIVERED TO													
		Chicago	Gary	Cleve- land	Birm- ingham	Buffalo	Youngs- town	Spar- rows Point	Granite City	Middle- town, Ohio	Gulf Ports, Cars	10 Pacific Ports, Cars	Detroit	New York	Phila- delphia
<b>SHEETS</b>															
Hot rolled <sup>15</sup>	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.20¢	2.10¢		2.65¢	2.20¢	2.34¢	2.27¢
Cold rolled <sup>1</sup>	3.05¢	3.05¢	3.05¢	3.05¢		3.05¢	3.05¢		3.15¢	3.05¢		3.70¢	3.15¢	3.39¢	3.37¢
Galvanized (24 gage) <sup>16</sup>	3.50¢	3.50¢	3.50¢		3.50¢	3.50¢	3.50¢	3.50¢	3.60¢	3.50¢		4.05¢		3.74¢	3.67¢
Enameling (20 gage)	3.35¢	3.35¢	3.35¢	3.35¢				3.35¢	3.45¢	3.35¢		4.00¢	3.45¢	3.71¢	3.67¢
Long terne <sup>2</sup>	3.80¢	3.80¢	3.80¢									4.55¢		4.16¢	4.12¢
<b>STRIP</b>															
Hot rolled <sup>8</sup>	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢			2.10¢		2.75¢	2.20¢	2.46¢	
Cold rolled <sup>4</sup>	2.80¢	2.90¢		2.80¢			2.80¢	(Worcester=3.00¢)				2.90¢		3.16¢	
Cooperage stock	2.20¢	2.20¢			2.20¢		2.20¢							2.56¢	
Commodity C-R	2.95¢	3.05¢		2.95¢			2.95¢	(Worcester=3.35¢)				3.05¢		3.31¢	
<b>TIN PLATE</b>															
Standard cokes, base box	\$5.00	\$5.00	\$5.00						\$5.10					5.36¢	5.32¢
Electro. box (0.25 lb.)	\$4.35	\$4.35	\$4.35						\$4.60						
Electro. box (0.50 lb.)	\$4.50	\$4.50	\$4.50						\$4.75						
Electro. box (0.75 lb.)	\$4.65	\$4.65													
<b>BLACK PLATE</b>															
29 gage <sup>8</sup>	3.05¢	3.05¢	3.05¢						3.15¢			4.05¢ <sup>12</sup>		3.37¢	
<b>TERNES, MFG.</b>															
Special coated, base box	\$4.30	\$4.30	\$4.30						\$4.40						
<b>BARS</b>															
Carbon steel	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢		(Duluth=2.25¢)		2.50¢	2.80¢	2.25¢	2.49¢	2.47¢	
Rail steel <sup>6</sup>	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢				2.50¢	2.80¢				
Reinforcing (billet) <sup>7</sup>	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢		2.50¢	2.55¢ <sup>13</sup>	2.25¢	2.39¢		
Reinforcing (rail) <sup>7</sup>	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢			2.50¢	2.55¢ <sup>13</sup>	2.25¢	2.47¢		
Cold finished <sup>8</sup>	2.65¢	2.65¢	2.65¢		2.65¢		2.65¢	(Detroit=2.70¢)	(Toledo=2.80¢)				2.99¢	2.97¢	
Alloy, hot rolled	2.70¢	2.70¢			2.70¢		(Bethlehem, Massillon, Canton=2.70¢)			2.80¢					
Alloy, cold drawn	3.35¢	3.35¢	3.35¢	3.35¢		3.35¢					3.45¢				
<b>PLATES</b>															
Carbon steel <sup>17</sup>	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢	(Coatesville and Claymont=2.10¢)	2.45¢	2.65¢	2.32¢	2.29¢	2.15¢	
Floor plates	3.35¢	3.35¢								3.70¢	4.00¢		3.71¢	3.67¢	
Alloy	3.50¢	3.50¢		(Coatesville=3.50¢)						3.95¢	4.15¢		3.70¢	3.59¢	
<b>SHAPES</b>															
Structural	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢	(Bethlehem=2.10¢)			2.45¢	2.75¢		2.27¢	2.215¢	
<b>SPRING STEEL, C-R</b>															
0.26 to 0.50 Carbon	2.80¢			2.80¢			(Worcester=3.00¢)								
0.51 to 0.75 Carbon	4.30¢			4.30¢			(Worcester=4.50¢)								
0.76 to 1.00 Carbon	6.15¢			6.15¢			(Worcester=6.35¢)								
1.01 to 1.25 Carbon	8.35¢			8.35¢			(Worcester=8.55¢)								
<b>WIRE <sup>9</sup></b>															
Bright <sup>14</sup>	2.80¢	2.60¢		2.60¢	2.60¢		(Worcester=2.70¢)	(Duluth=2.65¢)		3.10¢			2.92¢		
Galvanized							Add proper size extra and galvanizing extra to Bright Wire base								
Spring (High Carbon)	3.20¢	3.20¢		3.20¢			(Worcester=3.30¢)			3.70¢			3.52¢		
<b>PILING</b>															
Steel Sheet	2.40¢	2.40¢				2.40¢				2.95¢			2.72¢		

## EXCEPTIONS TO PRICE SCHED. NO. 6.

Slabs—Andrews Steel Co. \$41 basing pts.; Wheeling Steel Corp. (rerolling) 4 in. sq. or larger \$37.75 f.o.b. Portsmouth; Kaiser Co. (rerolling) \$58.64, (forging) \$64.64, (shell steel) \$74.64 f.o.b. Los Angeles.

Sheet bar—Empire Sheet & Tin Plate Co. \$39 mill; Wheeling Steel Corp. \$38 Portsmouth, Ohio; Phoenix Iron Co. \$47 mill; Granite City Steel \$47.50; Kaiser Co. rerolling \$58.64, (forging) \$64.64, f.o.b. Los Angeles.

Blooms—Phoenix Iron Co. (rerolling) \$41; (forging) \$47; Pgh. Steel Co. (rerolling) \$31.25, (forging) \$44.25; Wheeling Steel Corp.

burgh Steel Co. \$49.50; Kaiser Co. \$64.64, (shell steel) \$74.64, f.o.b. Los Angeles.

Billets, Rerolling—Continental Steel Corp. may charge Acme Steel in Chicago switching area \$34 plus freight from Kokomo, Ind.; Northwestern Steel & Wire Co. (Lend-Lease) \$41 mill; Wheeling Steel Corp. 4 in. sq. or larger \$37.75, smaller \$39.50 f.o.b. Portsmouth, Ohio; Stanley Works may sell Washburn Wire Co. under allocation at \$39 Bridgeport, Conn.; Keystone Steel & Wire Co. may sell Acme Steel Co. at Chicago base, f.o.b. Peoria; Phoenix Iron Co. \$41 mill; Continen-

## PRICES

### WAREHOUSE PRICES

*Delivered metropolitan areas per 100 lb. These are zoned warehouse prices in conformance with latest zoning amendment to OPA Price Schedule 49.*

Cities	SHEETS			STRIP		Plates 1/4 in. and heavier	Structural Shapes	BARS		ALLOY BARS			
	Hot Rolled (10 gage)	Cold Rolled	Galvanized (24 gage)	Hot Rolled	Cold Rolled			Hot Rolled	Cold Finished	Hot Rolled, NE 9442-45 Ann.	Hot Drawn, NE 8817-20	Cold Drawn NE 9442-45 Ann.	Cold Drawn NE 8817-20
Philadelphia	\$3.518	\$4.872 <sup>8</sup>	\$5.018a	\$3.922	\$4.772	\$3.605	\$3.868	\$3.822	\$4.072	\$5.966	\$7.066	\$7.272	\$8.322
New York	3.590	4.813 <sup>3</sup>	5.010	3.974 <sup>6</sup>	4.772	3.768	3.758	3.853	4.103	6.008	7.108	7.303	8.353
Boston	3.744	4.749 <sup>4</sup>	5.224 <sup>9</sup>	4.106	4.715	3.912	4.044	4.144	4.162	7.262	7.344	8.394	8.394
Norfolk	3.394	4.852	4.894	3.902	4.752	3.594	3.759	3.802	4.052	...	...	...	...
Chicago	3.25	4.20	5.231	3.60	4.651 <sup>7</sup>	3.55	3.55	3.50	3.75	5.75	6.85	6.85	7.90
Milwaukee	3.387	4.337 <sup>3</sup>	5.272 <sup>4</sup>	3.737	4.787 <sup>17</sup>	3.687	3.687	3.637	3.887	5.987	7.087	7.087	8.137
Cleveland	3.35	4.40	4.877 <sup>4</sup>	3.60	4.45	3.40	3.588	3.35	3.75	5.956	7.056	6.85	7.90
Buffalo	3.35	4.40	4.754	3.819	4.669	3.63	3.40	3.35	3.75	5.75	6.85	6.85	7.90
Detroit	3.45	4.50	5.004	3.70	4.659 <sup>17</sup>	3.609	3.681	3.45	3.80	6.08	7.18	7.159	8.209
Cincinnati	3.425	4.475 <sup>3</sup>	4.825 <sup>5</sup>	3.575	4.711	3.611	3.681	3.611	4.011	...	...	...	...
St. Louis	3.397	4.347 <sup>3</sup>	5.172 <sup>4</sup>	3.747	4.931 <sup>17</sup>	3.697	3.687	3.647	4.031	6.131	7.231	7.231	8.281
Pittsburgh	3.35	4.40	4.75	3.60	4.45	3.40	3.40	3.35	3.75	5.75	6.85	6.85	7.90
St. Paul	3.51	4.48	5.257 <sup>4</sup>	3.86	4.351 <sup>7</sup>	3.811 <sup>3</sup>	3.811 <sup>3</sup>	3.761 <sup>3</sup>	4.361	6.09	7.19	7.561	8.711
Omaha	3.865	5.443	5.608 <sup>4</sup>	4.215	4.185	4.165	4.165	4.115	4.43	...	...	...	...
Indianapolis	3.58	3.58	4.568	4.918	3.768	4.78	3.63	3.58	3.98	8.08	7.18	7.18	8.22
Birmingham	3.45	...	4.75	3.70	...	3.55	3.55	3.50	4.43	...	...	...	...
Memphis	3.965 <sup>7</sup>	4.68	3.285	4.215	...	4.065	4.065	4.015	4.33	...	...	...	...
New Orleans	4.058 <sup>8</sup>	4.95	5.358	4.308	...	4.158	4.158 <sup>8</sup>	4.108 <sup>8</sup>	4.629	...	...	...	...
Houston	3.763	5.573	6.313 <sup>1</sup>	4.313	...	4.25	4.25	3.75	6.373 <sup>8</sup>	7.223	8.323	8.323	9.373
Los Angeles	5.00	7.20 <sup>3</sup>	6.10 <sup>4</sup>	4.95	5.813 <sup>18</sup>	4.95	4.65	5.40	5.583	8.304	9.404	9.404	10.454
San Francisco	4.551 <sup>4</sup>	7.30 <sup>4</sup>	6.35 <sup>4</sup>	4.504 <sup>14</sup>	7.333 <sup>17</sup>	4.651 <sup>4</sup>	4.351 <sup>4</sup>	4.151 <sup>4</sup>	5.333	8.304	9.404	9.404	10.454
Seattle	4.651 <sup>2</sup>	7.05 <sup>4</sup>	5.95 <sup>4</sup>	4.251 <sup>2</sup>	...	4.751 <sup>2</sup>	4.351 <sup>2</sup>	4.351 <sup>2</sup>	5.783	...	...	...	...
Portland	4.851	6.60 <sup>4</sup>	5.75 <sup>4</sup>	4.751 <sup>1</sup>	...	4.751 <sup>1</sup>	4.451 <sup>1</sup>	4.451 <sup>1</sup>	5.533	8.304	9.404	9.404	10.454
Salt Lake City	4.531 <sup>7</sup>	...	6.171 <sup>8</sup>	5.531 <sup>7</sup>	...	4.981 <sup>7</sup>	4.981 <sup>7</sup>	4.881 <sup>7</sup>	5.90	...	...	...	...

### National Emergency Steels MILL EXTRAS

Designa- tion	Basic Open-Hearth		Electric Furnace		Designa- tion	Basic Open-Hearth		Electric Furnace		Bars and Bar-Strip	Billets, Blooms, and Slabs	Bars and Bar-Strip	Billets, Blooms, and Slabs
	Bars and Bar-Strip	Billets, Blooms, and Slabs	Bars and Bar-Strip	Billets, Blooms, and Slabs		Bars and Bar-Strip	Billets, Blooms, and Slabs	Bars and Bar-Strip	Billets, Blooms, and Slabs				
NE 8612	0.65 <sup>6</sup>	\$13.00	\$1.15	\$23.00	NE 9427	0.75	15.00	1.25	25.00	...	...	...	...
NE 8615	0.65	13.00	1.15	23.00	NE 9430	0.75	15.00	1.25	25.00	...	...	...	...
NE 8617	0.65	13.00	1.15	23.00	NE 9432	0.75	15.00	1.25	25.00	...	...	...	...
NE 8620	0.65	13.00	1.15	23.00	NE 9435	0.75	15.00	1.25	25.00	...	...	...	...
NE 8622	0.65	13.00	1.15	23.00	NE 9437	0.75	15.00	1.25	25.00	...	...	...	...
NE 8625	0.65	13.00	1.15	23.00	NE 9440	0.75	15.00	1.25	25.00	...	...	...	...
NE 8627	0.65	13.00	1.15	23.00	NE 9442	0.80	16.00	1.30	26.00	...	...	...	...
NE 8630	0.65	13.00	1.15	23.00	NE 9445	0.80	16.00	1.30	26.00	...	...	...	...
NE 8632	0.65	13.00	1.15	23.00	NE 9447	0.80	16.00	1.30	26.00	...	...	...	...
NE 8635	0.65	13.00	1.15	23.00	NE 9450	0.80	16.00	1.30	26.00	...	...	...	...
NE 8637	0.65	13.00	1.15	23.00	NE 9452	0.85 <sup>6</sup>	\$13.00	\$1.15	\$23.00	...	...	...	...
NE 8640	0.65	13.00	1.15	23.00	NE 9722	0.85 <sup>6</sup>	\$13.00	\$1.15	\$23.00	...	...	...	...
NE 8642	0.65	13.00	1.15	23.00	NE 9727	0.85	13.00	1.15	23.00	...	...	...	...
NE 8645	0.65	13.00	1.15	23.00	NE 9732	0.85	13.00	1.15	23.00	...	...	...	...
NE 8647	0.65	13.00	1.15	23.00	NE 9737	0.85	13.00	1.15	23.00	...	...	...	...
NE 8650	0.65	13.00	1.15	23.00	NE 9742	0.85	13.00	1.15	23.00	...	...	...	...
NE 8712	0.70 <sup>6</sup>	\$14.00	\$1.20	\$24.00	NE 9747	0.65	13.00	1.15	23.00	...	...	...	...
NE 8715	0.70	14.00	1.20	24.00	NE 9750	0.65	12.00	1.15	23.00	...	...	...	...
NE 8717	0.70	14.00	1.20	24.00	NE 9753	0.65	13.00	1.15	23.00	...	...	...	...
NE 8720	0.70	14.00	1.20	24.00	NE 9768	0.65	13.00	1.15	23.00	...	...	...	...
NE 8722	0.70	14.00	1.20	24.00	NE 9765	0.65	13.00	1.15	23.00	...	...	...	...
NE 8725	0.70	14.00	1.20	24.00	NE 9820	1.30	\$26.00	\$1.80	\$36.00	...	...	...	...
NE 8727	0.70	14.00	1.20	24.00	NE 9830	1.30	\$26.00	\$1.80	\$36.00	...	...	...	...
NE 8730	0.70	14.00	1.20	24.00	NE 9832	1.30	26.00	1.80	36.00	...	...	...	...
NE 8732	0.70	14.00	1.20	24.00	NE 9835	1.30	26.00	1.80	36.00	...	...	...	...
NE 8735	0.70	14.00	1.20	24.00	NE 9837	1.30	26.00	1.80	36.00	...	...	...	...
NE 8737	0.70	14.00	1.20	24.00	NE 9840	1.30	26.00	1.80	36.00	...	...	...	...
NE 8740	0.70	14.00	1.20	24.00	NE 9842	1.30	26.00	1.80	36.00	...	...	...	...
NE 8742	0.70	14.00	1.20	24.00	NE 9845	1.30	26.00	1.80	36.00	...	...	...	...
NE 8745	0.70	14.00	1.20	24.00	NE 9847	1.30	26.00	1.80	36.00	...	...	...	...
NE 8747	0.70	14.00	1.20	24.00	NE 9850	1.30	26.00	1.80	36.00	...	...	...	...
NE 9415	0.75 <sup>6</sup>	\$15.00	\$1.25	\$25.00	NE 9912	\$1.20	\$24.00	\$1.85	\$31.00	...	...	...	...
NE 9417	0.75	15.00	1.25	25.00	NE 9917	1.20	24.00	1.85	31.00	...	...	...	...
NE 9420	0.75	15.00	1.25	25.00	NE 9920	1.20	24.00	1.85	31.00	...	...	...	...
NE 9422	0.75	15.00	1.25	25.00	NE 9922	1.20	24.00	1.85	31.00	...	...	...	...
NE 9425	0.75	15.00	1.25	25.00	NE 9925	1.20	24.00	1.85	31.00	...	...	...	...

Note 1: The ranges shown are restricted to sizes 100 sq. in. or less or equivalent cross-sectional area 18 in. wide or under, with a maximum individual piece weight of 7000 lb. irrespective of size. Note 2: For steels ordered to such ranges, below the size and weight restriction, the average of all the chemical checks must be within the limits specified subject to check analysis variations given in Table 4, Section 10, A.L.S.I. Steel Products Manual. Note 3: When acid open-hearth is specified and acceptable, add to basic open-hearth alloy differential 0.25c per lb. for bars and bar strip and \$5 per gross ton for billets, blooms and slabs. Note 4: The extras shown are in addition to the base price of \$2.70 for 100 lb. on finished products and \$54 per gross ton on semi-finished steel, major basing points, and are in cents per pound when applicable to bars and bar-strip and in dollars per gross ton when applicable to billets, blooms and slabs. The full extra applicable over the base price is the total of all extras indicated by the specific requirements of the order. The higher extra shall be charged for any size falling between two published extras.

### SEMI-FIN

*Carbon, I*

per gross ton

Exemptions: Ph

13.25, f.o.b.

\$43.00; E

13.25, f.o.b.

## PRICES

### SEMI-FINISHED STEEL

*Carbon, Rolling*  
per gross ton, f.o.b. mill... \$31.00  
Exceptions: Phoenix Iron Co. may  
charge, \$38.75; Kaiser Co., \$43.00 f.o.b.  
West Coast ports; Empire Sheet & Tin-  
Co., \$34.25; Pgh. Steel Co., \$33.10.

*Carbon, Forging*  
per gross ton, f.o.b. Birmingham,  
Buffalo, Chicago, Cleveland,  
Gary, Pittsburgh, Youngs-  
ton ..... \$36.00  
Exceptions: Phoenix Iron Co. may  
charge, \$39.25, f.o.b. Mansfield, Ohio; West  
Coast producers, \$43.00; Empire Sheet & Tinplate  
producers, \$48.00, f.o.b. Pacific  
Ports; Pgh. Steel Co., \$38.10.

*Alloy*  
per gross ton, f.o.b. Bethlehem,  
Buffalo, Canton, Coates-  
ville, Chicago, Massillon, Pitts-  
burgh ..... \$45.00  
Exceptions: C/L delivered Detroit add  
delivered East Michigan add  
Connors Steel Co. may charge  
f.o.b. Birmingham.

*Blooms and Slabs*  
Pittsburgh, Chicago, Gary, Cleveland,  
Youngstown, Buffalo, Birmingham, Sparrows  
Point (rerolling only). Prices delivered  
Detroit are \$2.00 higher; delivered  
E. Michigan, \$3 higher; f.o.b.  
billetts only, \$2.00 higher; billets  
Pacific ports are \$12 higher; Provo,  
\$10 higher. Delivered prices do not  
at three per cent tax on freight rates.

*Per Gross Ton*  
Billets ..... \$34.00  
Slabs quality ..... 40.00  
or exceptions on semi-finished steel  
see the footnote on the page of finished  
prices.

*Billets, Blooms, Slabs*  
Pittsburgh, Chicago, Canton, Mas-  
son, Buffalo or Bethlehem,  
per gross ton ..... \$54.00  
delivered Detroit \$2.00 higher;  
Michigan, \$3.00 higher.

*Steel*  
*Per Gross Ton*  
12 in. ..... \$52.00  
18 in. ..... 54.00  
and over ..... 56.00  
Basic open hearth shell steel, f.o.b.  
Pittsburgh, Chicago, Buffalo, Gary, Cleve-  
land, Youngstown and Birmingham.  
Prices delivered Detroit are \$2.00  
higher; E. Michigan, \$3 higher.

Exception: Follansbee Steel Corp.  
offered to sell at \$13.00 per gross ton,  
Toronto, Ohio, above base price of  
\$12.00.

Note: The above base prices apply on  
1000 tons of a size and section to  
which are to be added extras for chemical  
elements, cutting, or quantity.

*Steel Bars*  
Pittsburgh, Chicago, Cleveland, Youngs-  
ton, Buffalo, Canton, Sparrows Point.  
*Per Gross Ton*  
Open hearth or bessemer ..... \$34.00

*Per Lb.*  
Pittsburgh, Chicago, Youngstown,  
Mass., Pa., Sparrows Point, Md.  
Sheared, universal and sheared .. 1.90c.

*Steel Rods*  
(No. 5 to 9/32 in.)  
*Per Lb.*  
Pittsburgh, Chicago, Cleveland ... 2.00c.  
Boston, Mass. ..... 2.10c.  
Birmingham ..... 2.00c.  
San Francisco ..... 2.50c.  
Boston ..... 2.25c.  
12 in. to 47/64 in., 0.15c. a lb. high-  
Quantity extras apply.

### TOOL STEEL

Pittsburgh, Bethlehem, Syracuse)  
*Base per lb.*  
Speed ..... 67c.  
High molybdenum ..... 54c.  
Molybdenum ..... 57 1/2c.  
Carbon-chromium ..... 43c.  
Hardening ..... 24c.  
Tungsten carbon ..... 22c.  
Tungsten carbon ..... 18c.  
Molybdenum carbon ..... 14c.  
Warehouse prices east of Mississippi  
1c. a lb. higher; west of Mississippi  
higher.

# Annealing in the STRONG manner



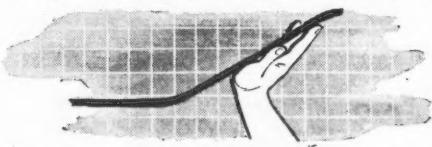
USERS OF STRONG STEEL CASTINGS are keenly aware of how much they gain in the elimination of internal stresses by the Strong heat-treating and annealing processes. The car annealing furnace shown above is 12 feet wide by 14 feet long. It is oil fired and controlled by recording pyrometer. Wherever it is desirable, Strong double anneals its castings for extra protection. Strong also uses a pit type annealing furnace, oil fired with heat recorder control. Strong can tell a host of vital facts about heat-treating every steel casting buyer should know. Just ask for them.

STRONG IN NAME  
STRONG IN FACT

STRONG STEEL FOUNDRY COMPANY, BUFFALO, N.Y.

**Strong**  
TENSILE STRENGTH · ELONGATION

# PUSH PRODUCTION UP



# PUSH COSTS DOWN



## with STANDARD PUSH-BAR CONVEYORS



CONVEYORS do more than carry in a horizontal plane. Standard Push-bar Conveyors carry and move packages and containers up a slope or incline at 30, 45, or 60 degree angles; vertical lift conveyors carry commodities straight up and down to the height of several floors. These conveyors that lift and lower can be used individually or combined with a conveyor system to provide uninterrupted flow of commodities between floors.

Push-bar conveyors and vertical lift conveyors are part of Standard Conveyor's wide variety of equipment to cut handling and production costs — power and gravity conveyors in belt, roller, chain, and slat types; spiral chutes, tiering machines, portable pilers, pneumatic tube systems.

Standard Conveyor has been headquarters for conveyors for more than 40 years; we are qualified by long experience to recommend and build efficient equipment for any given installation. Write for catalog IA-35, "Conveyors by Standard" — a profusely illustrated reference book that will prove very useful to you.

**Spiral Chutes**

**Pneumatic Tube Systems**

**Tiering and Lifting Machines**

**Portable Pilers**

**STANDARD**

*Gravity and Power*

**CONVEYORS**

**STANDARD CONVEYOR CO.**  
General Offices: North St. Paul 9, Minn.  
Sales and Service in Principal Cities

## PRICES

### WELDED PIPE AND TUBING

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills  
(F.o.b. Pittsburgh only on wrought pipe)  
Base Price—\$200.00 per Net Ton

#### Steel (Butt Weld)

	Black	Galv.
1/2 in.	63 1/2	51
5/8 in.	66 1/2	55
1 to 3 in.	68 1/2	57 1/2

#### Wrought Iron (Butt Weld)

1/2 in.	24	3 1/2
5/8 in.	30	10
1 and 1/4 in.	34	16
1 1/2 in.	38	18 1/2
2 in.	37 1/2	18

#### Steel (Lap Weld)

2 in.	61	49 1/2
2 1/2 in. and 3 in.	64	52 1/2
3 1/2 to 6 in.	66	54 1/2

#### Wrought Iron (Lap Weld)

2 in.	30 1/2	12
2 1/2 to 3 1/2 in.	31 1/2	14 1/2
4 in.	33 1/2	18
4 1/2 to 8 in.	32 1/2	17

1/2 in.	61 1/2	50 1/2
5/8 in.	65 1/2	54 1/2
1 to 3 in.	67	57

#### Wrought Iron (Same as Above)

1/2 in.	25	6
5/8 in.	31	12
1 to 2 in.	38	19 1/2

#### Steel (Lap, extra strong, plain ends)

2 in.	59	48 1/2
2 1/2 and 3 in.	63	52 1/2
3 1/2 to 6 in.	66 1/2	56

#### Wrought Iron (Same as Above)

2 in.	33 1/2	15 1/2
2 1/2 to 4 in.	39	22 1/2
4 1/2 to 6 in.	37 1/2	21

On butt weld and lap weld steel pipe jobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base card.

F.o.b. Gary prices are two points lower discount or \$4 a ton higher than Pittsburgh or Lorain on lap weld and one point lower discount, or \$2 a ton higher on all butt weld.

## CAST IRON WATER PIPE

Per Net Ton

6-in. and larger, del'd Chicago	... \$54.80
6-in. and larger, del'd New York	52.20
6 in. and larger, Birmingham	46.00
6-in. and larger f.o.b. cars, San Francisco or Los Angeles	69.40
6-in. and larger f.o.b. cars, Seattle	71.20

Class "A" and gas pipe, \$3 extra: 4-in. pipe is \$3 a ton above 6-in. Prices shown are for lots of less than 200 tons. For 200 tons or over, 6-in. and larger are \$45 at Birmingham and \$53.80 delivered Chicago, \$59.40 at San Francisco and Los Angeles, and \$70.20 at Seattle. Delivered prices do not reflect new 3 percent tax on freight rates.

## BOILER TUBES

Seamless Steel and Lap Weld Commercial Boiler Tubes and Locomotive Tubes, Minimum Wall. Net base prices per 100 ft. f.o.b. Pittsburgh, in carload lots.

Lap Weld, Cold Hot

Drawn Rolled Rolled

2 in. o.d. 13 B.W.G.	15.03	13.04	12.38
2 1/2 in. o.d. 12 B.W.G.	20.21	17.54	16.58
3 in. o.d. 12 B.W.G.	22.48	19.50	18.35
3 1/2 in. o.d. 11 B.W.G.	28.37	24.62	23.15
4 in. o.d. 10 B.W.G.	35.20	30.54	28.66
(Extras for less carload quantities)			
40,000 lb. or ft. and over	... Base		
30,000 lb. or ft. to 39,999 lb. or ft.	5%		
20,000 lb. or ft. to 29,999 lb. or ft.	10%		
10,000 lb. or ft. to 19,999 lb. or ft.	20%		
5,000 lb. or ft. to 9,999 lb. or ft.	30%		
2,000 lb. or ft. to 4,999 lb. or ft.	45%		
Under 2,000 lb. or ft.	65%		

## PRICES

### WIRE PRODUCTS

To the trade, f.o.b. Pittsburgh, Chicago, Cleveland, Birmingham, Duluth

	Pacific	Coast
Basing Points	Basing Points	Named Points
Base per Keg	Base per Keg	Base per Keg
Standard wire nails	\$2.55	\$3.05
Coated nails	2.55	3.05
Cut nails, carloads	2.55	3.05
Annealed fence wire	\$3.05	\$3.55
Annealed galv. fence wire	3.40	3.90
Base Column		
Woven wire fence	.67	.85
Fence posts, carloads	.69	.86
Single loop bale ties	.59	.84
Galvanized barbed wire**	.70	.80
Twisted barbless wire	.70	

\*15 1/2 gage and heavier. \*\*On 80-rod spools in carload quantities.

†Prices subject to switching or transportation charges.

‡Add 25c. per 100 lb. to delivered price—OPA Interim Increase, Jan. 11, 1945.

### BOLTS, NUTS, RIVETS, SET SCREWS

#### Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

#### Machine and Carriage Bolts:

Base discount less case lots

	Per Cent Off List
1/4 in. & smaller x 6 in. & shorter	65 1/2
3/16 & 5/8 in. x 6 in. & shorter	63 1/2
5/16 to 1 in. x 6 in. shorter	61
1 1/2 in. & larger, all lengths	59
All diameters over 6 in. long	59
Lag, all sizes	62
Plow bolts	65

#### Nuts, Cold Punched or Hot Pressed: (Hexagon or Square)

1/4 in. and smaller	62
9/16 to 1 in. inclusive	59
1 1/4 to 1 1/2 in. inclusive	57
1 1/2 in. and larger	56

On above bolts and nuts, excepting plow bolts, additional allowance of 10 per cent for full container quantities. There is an additional 5 per cent allowance for carload shipments.

#### Semi-Fin. Hexagon Nuts U.S.S. S.A.E.

	Base discount less keg lots
7/16 in. and smaller	64
1/2 in. and smaller	62
1/2 in. through 1 in.	60
9/16 in. through 1 in.	59
1 1/4 in. through 1 1/2 in.	57
1 1/2 in. and larger	56

In full keg lots, 10 per cent additional discount.

#### Stove Bolts Consumer

Packages, nuts loose 71 and 10  
In packages, with nuts attached 71  
In bulk 80

On stove bolts freight allowed up to 35c. per 100 lb. based on Cleveland, Chicago, New York on lots of 200 lb. or over.

#### Large Rivets

(1/4 in. and larger)

Base per 100 Lb.

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham 33.75

#### Small Rivets

(7/16 in. and smaller)

Per Cent Off List

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham 65 and 5

Consumer

#### Cap and Set Screws Per Cent Off List

Upset full fin. hexagon head cap screws, coarse or fine thread, up to and incl. 1 in. x 6 in. 64

Upset set screws, cup and oval points 71

Milled studs 46

Flat head cap screws, listed sizes 36

Fillister head cap, listed sizes 51

Freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago or New York on lots of 200 lb. or over.

#### ROOFING TERNE PLATE

(F.o.b. Pittsburgh, 112 Sheets)

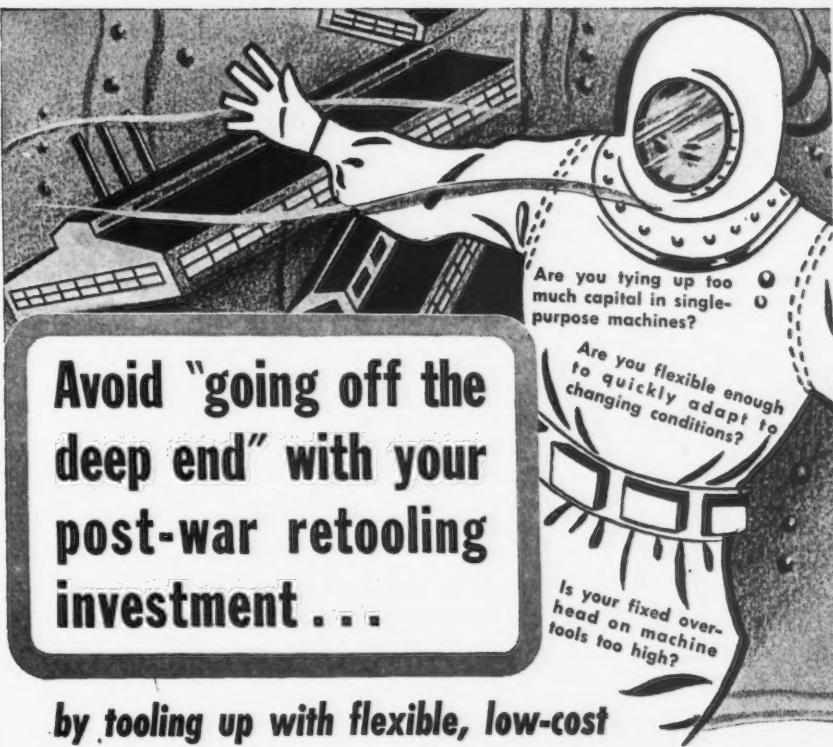
20x14 in. 20x28 in.

8-lb. coating I.C. \$6.00 \$12.00

15-lb. coating I.C. 7.00 14.00

30-lb. coating I.C. 7.50 15.00

MA-17



## Delta-Milwaukee Machine Tools

Delta provides a new approach to tooling — proven sound by war production — without the delay and heavy capital risk involved in buying costly, cumbersome, inflexible, special machines.

Using low-cost, stock-model Delta components, you can modernize machines in your plant that are rapidly approaching obsolescence, salvaging parts still in good condition.

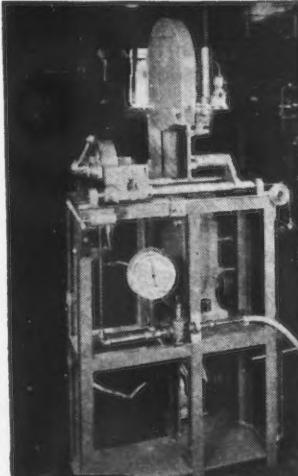
You can devise high-production, special-purpose machines that can be quickly converted to other uses when conditions change.

And, because of the portability and compactness of Delta-Milwaukee Machine Tools, you can revise production line layouts, to get the best sequence of operations for increased output per man-hour, with minimum change-over time.

You cut down your fixed investment in machine tools . . . retain more liquid working capital for other post-war needs. Delta's savings in cost — and in weight and space — are not obtained at the expense of quality. They result from advanced design and from quantity production of standard models.

For a flexible, safe, satisfactory solution to the uncertain production problems that lie ahead—and for results that are creditable to all concerned — tool up with low-cost Delta-Milwaukee Machine Tools.

**Tear out coupon and mail today!**



**DELTA  
MILWAUKEE  
Machine Tools**



Typical of industry's wide use of special-purpose units built around standard, low-cost Delta machines instead of much more expensive special equipment — is this Delta 14" Metal Cutting Band Saw set-up devised for splitting large bushings approximately 6 1/2" x 5 1/2", material SAE 1020. It is not only efficient and low in cost, but doubles former production for the same operation.

THE DELTA MANUFACTURING CO.  
704C E. Vienna Ave., Milwaukee 1, Wisconsin

Please send my free copies of Delta's 76-page Blue Book and catalog of low-cost machine tools.

Name.....  
Position.....  
Company.....  
Address.....  
City.....(.....) State.....

## PRICES

### PIG IRON

All prices set in bold face type are maximums established by OPA as of February 14, 1945. Other domestic prices (in italics) are delivered quotations per gross ton computed on the basis of the official maximum. Delivered prices do not reflect 3 per cent tax on freight rates.

	No. 2 Foundry	Basic	Bessemer	Malleable	Low Phosphorus	Charcoal	
Boston	<b>\$26.50</b>	<b>\$26.00</b>	<b>\$27.50</b>	<b>\$27.00</b>			
Brooklyn	<b>28.50</b>	<b>28.00</b>		<b>29.00</b>			
Jersey City	<b>27.53</b>	<b>27.03</b>	<b>28.53</b>	<b>28.03</b>			
Philadelphia	<b>26.84</b>	<b>26.34</b>	<b>27.84</b>	<b>27.34</b>	<b>\$31.74</b>		
Bethlehem							
Everett, Mass.	26.00	25.50	27.00	26.50			
Swedesland, Pa.	26.00	25.50	27.00	26.50			
Steelton, Pa.		25.50			<b>\$30.50</b>		
Birdsboro, Pa.	26.00	25.50	27.00	26.50	<b>30.50</b>		
Sparrows Point, Md.	26.00	25.50					
Erie, Pa.	25.00	24.50	26.00	25.50			
Neville Island, Pa.	25.00	24.50	25.50	25.00			
Sharpsville, Pa. (1)	25.00	24.50	25.50	25.00			
Buffalo	25.00	24.00	26.00	25.50	<b>30.50</b>		
Cincinnati, Ohio		<b>26.11</b>	<b>25.61</b>		<b>26.11</b>		
Canton, Ohio	<b>26.39</b>	<b>25.89</b>	<b>26.89</b>	<b>26.39</b>	<b>33.69</b>		
Mansfield, Ohio	<b>26.94</b>	<b>26.44</b>	<b>27.44</b>	<b>26.94</b>	<b>33.86</b>		
St. Louis	<b>25.50</b>	<b>25.50</b>					
Chicago	25.00	24.50	25.50	25.00		<b>\$37.34</b>	
Granite City, Ill.	25.00	24.50	25.50	25.00			
Cleveland	25.00	24.50	25.50	25.00			
Hamilton, Ohio	25.00	24.50	25.50	25.00			
Toledo	25.00	24.50	25.50	25.00			
Youngstown	25.00	24.50	25.50	25.00			
Detroit	25.00	24.50	25.50	25.00			
Lake Superior, I.C.						<b>34.00</b>	
Lyles, Tenn., fc. (2)						<b>33.00</b>	
St. Paul		<b>27.63</b>	<b>27.13</b>	<b>28.10</b>	<b>27.63</b>	<b>40.80</b>	
Duluth	25.50	25.00	26.00	25.50			
Birmingham	21.38	20.00	26.00				
Los Angeles	<b>27.95</b>						
San Francisco	<b>27.95</b>						
Seattle	<b>27.95</b>						
Provo, Utah	23.00	22.50					
Montreal		<b>28.50</b>	<b>28.50</b>		<b>29.00</b>		
Toronto		<b>26.50</b>	<b>26.50</b>		<b>27.00</b>		
GRAY FORGE IRON: Valley or Pittsburgh furnace						<b>\$24.50</b>	

(1) Struthers Iron & Steel Co., Struthers, Ohio, may charge 50c. a ton in excess of basing point prices for No. 2 foundry, basic, bessemer and malleable.

(2) Price shown is for low-phosphorus iron; high phosphorus sells for \$28.50 at the furnace.

Basing point prices are subject to switching charges; Silicon differentials (not to exceed 50c. a ton for each 0.5 per cent silicon content in excess of base grade which is 1.75 to 2.25 per cent); Phosphorus differentials, a reduction of 38c. per ton for phosphorus content of 0.70 per cent and over; Manganese differentials, a charge not to exceed 50c. per ton for each 0.50 per cent manganese content in excess of 1.00 per cent. Effective March 3, 1943, \$2 per ton extra may be charged for 0.5 to 0.75 per cent nickel content and \$1 per ton extra for each additional 0.25 per cent nickel.

### METAL POWDERS

Prices are based on current market prices of ingots plus a fixed figure. F.O.B. shipping point, c. per lb. ton lots.

Copper, electrolytic, 150 and 200 mesh ..... **\$1 1/4** to **23 1/4**.  
 Copper, reduced, 150 and 200 mesh ..... **20 1/2** to **25 1/4**.  
 Iron, commercial, 100 and 200 mesh 96 + % Fe ..... **13 1/2** to **15 1/2**.  
 Iron, crushed, 200 mesh and finer, 90 + % Fe, carload lots ..... **40**.  
 Iron, hydrogen reduced, 300 mesh and finer, 98 1/2 + % Fe, drum lots ..... **62 1/2**.  
 Iron, electrolytic, unannealed, 300 mesh and coarser, 99 + % Fe 30 to 31c.  
 Iron, electrolytic, annealed minus 100 mesh, 99 + % Fe ..... **42 1/2**.  
 Iron, carbonyl, 300 mesh and finer, 98-99.8 + % Fe ..... **90**.  
 Aluminum, 100 and 200 mesh ..... **\*23** to **26**.  
 Antimony, 100 mesh ..... **20 1/2**.  
 Cadmium, 100 mesh ..... **1**.  
 Chromium, 150 mesh ..... **\$1.08**.  
 Lead, 100, 200 & 300 mesh ..... **11 1/2** to **13 1/2**.  
 Manganese, 150 mesh ..... **5 1/2**.  
 Nickel, 150 mesh ..... **51 1/2**.  
 Solder powder, 100 mesh ..... **8 1/2** c. plus metal  
 Tin, 100 mesh ..... **58 1/2**.  
 Tungsten metal powder, 98%-99%, any quantity, per lb. ..... **32.60**.  
 Molybdenum powder, 99%, in 200-lb. kegs, f.o.b. York, Pa., per lb. ..... **32.60**.  
 Under 100 lb. ..... **31.00**.

\*Freight allowed east of Mississippi.

### COKE

Furnace, beehive (f.o.b. oven) Net Ton  
 Connellsburg, Pa. ..... **\$7.00**.  
 Foundry, beehive (f.o.b. oven)  
 Fayette Co., W. Va. ..... **8.10**.  
 Connellsburg, Pa. ..... **8.35**.  
 Foundry, By-Product  
 Chicago, del'd ..... **13.35**.  
 Chicago, f.o.b. ..... **13.60**.  
 New England, del'd ..... **14.35**.  
 Kearny, N. J., f.o.b. ..... **12.65**.  
 Philadelphia, del'd ..... **13.88**.  
 Buffalo, del'd ..... **13.00**.  
 Portsmouth, Ohio, f.o.b. ..... **11.10**.  
 Painesville, Ohio, f.o.b. ..... **11.75**.  
 Erie, del'd ..... **12.80**.  
 Cleveland, del'd ..... **12.90**.  
 Cincinnati, del'd ..... **12.85**.  
 St. Louis, del'd ..... **13.85**.  
 Birmingham, del'd ..... **10.80**.  
 \*Hand drawn ovens using trucked coal permitted to charge \$7.75 per ton plus transportation charges.



**LEE**  
*Quality Springs*  
 ALL SHAPES • ALL SIZES • ALL MATERIALS



## PRICES

### REFRACTORIES (F.o.b. Works)

#### Fire Clay Brick

Per 1000

Super-duty brick, St. Louis	\$66.55
First quality, Pa., Md., Ky., Mo., Ill.	52.85
First quality, New Jersey	57.70
Sec. quality, Pa., Md., Ky., Mo., Ill.	47.95
Sec. quality, New Jersey	52.55
No. 1 Ohio	44.30
Ground fire clay, net ton	7.80

#### Silica Brick

Pennsylvania and Birmingham	\$52.85
Chicago District	60.65
Silica cement, net ton (Eastern)	9.25

#### Chrome Brick

Per Net Ton

Standard chemically bonded, Balt., Plymouth Meeting, Chester	\$54.00
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#### Magnesite Brick

Standard, Balt., and Chester	\$76.00
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Chemically bonded, Baltimore	65.00
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#### Gran Magnesite

Domestic, f.o.b. Balt., and Chester	\$43.48
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Domestic, f.o.b. Chewelah, Wash.	\$43.48
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(In bulk)	22.00
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### RAILS, TRACK SUPPLIES

(F.o.b. Mill)

Standard rails, heavier than 60 lb.	
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No. 1 O.H., gross ton	\$40.00
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Angle splice bars, 100 lb.	2.70
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(F.o.b. Basing Points)	Per Gross Ton
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Light rails (from billets)	\$40.00
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Light rails (from rail steel)	39.00
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Basis per Lb.	
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Cut spikes	2.00c
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Screw spikes	5.15c
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Tie plate, steel	2.15c
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Tie plates, Pacific Coast	2.30c
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Track bolts	4.75c
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Track bolts, heat treated, to railroads	5.00c
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Track bolts, jobbers discount	62.5
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Basing points, light rails, Pittsburgh, Chicago, Birmingham; cut spikes and tie plates—Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; tie plates alone—Steelton, Pa., Buffalo. Cut spikes alone—Youngstown, Lebanon, Pa., Richmond, Oregon and Washington ports, add 25c.	
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*Add \$3.00 per gross ton to delivered price	
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-OPA interim increase, Jan. 11, 1945.	
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### CORROSION AND HEAT-RESISTING STEEL

(Per lb. base price, f.o.b. Pittsburgh)

#### Chromium-Nickel Alloys

No. 304 No. 302

Forging billets	21.25c
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Bars	25.00c
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Plates	29.00c
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Structural shapes	25.00c
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Sheets	26.00c
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Hot rolled strip	22.50c
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Cold rolled strip	28.00c
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Drawn wire	26.90c
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24.00c	24.00c
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#### Straight-Chromium Alloys

No. 410 No. 430 No. 442 No. 446

Billets	15.725c
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Bars	18.50c
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Plates	22.50c
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Structural shapes	25.50c
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Sheets	26.50c
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Hot strip	17.00c
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17.50c	17.50c
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24.00c	24.00c
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35.00c	35.00c
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Cold strip	22.00c
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## FERROALLOY PRICES

### **Ferromanganese**

78-82% Mn, maximum contract base price per gross ton, lump size, f.o.b. car at Baltimore, Bethlehem, Philadelphia, New York, Birmingham, Rockdale, Rockwood, Tenn. Carload lots (bulk) ..... \$135.00 Carload lots (packed) ..... 141.00 Less ton lots (packed) ..... 148.50 \$1.70 for each 1% above 82% Mn; penalty, \$1.70 for each 1% below 78%.

### **Manganese Metal**

Contract basis, lump size, per lb. of metal, f.o.b. shipping point with freight allowed. Spot sales add 2c. per lb. 96-98% Mn, .2% max. C, 1% max. Si, 2% max. Fe. Carload, bulk ..... 36c. L.c.l. lots ..... 38c. 95-97% Mn, .2% max. C, 1.5% max. Si, 2.5% max. Fe. Carload, bulk ..... 34c. L.c.l. lots ..... 35c.

### **Spiegeleisen**

Maximum base, contract prices, per gross ton, lump, f.o.b. Palmerton, Pa. 16-19% Mn 19-21% Mn 3% max. Si 3% max. Si Carleads ..... \$35.00 Less ton ..... 47.50 48.50

### **Electric Ferrosilicon**

OPA maximum base price cents per lb. contained Si, lump size in carloads, f.o.b. shipping point with freight allowed.

	Eastern	Central	Western
Zone	Zone	Zone	
50% Si	6.5c.	7.1c.	7.25c.
75% Si	8.05c.	8.20c.	8.75c.
80-90% Si	8.90c.	9.05c.	9.55c.
90-95% Si	11.95c.	11.20c.	11.65c.

Spot sales add: 45c. per lb. for 50% Si, 3c. per lb. for 75% Si, .35c. per lb. for 80-90% and 90-95% Si.

### **Silvery Iron**

(C/L, Per Gross Ton, base 6.00 to 6.50 Si) F.o.b. Jackson, Ohio ..... \$30.50 Buffalo ..... 31.75 For each additional 0.50% silicon add \$1 a ton. For each 0.50% manganese over 1% add 50c. a ton. Add \$1 a ton for 0.75% phosphorus or over.

### **Bessemer Ferrosilicon**

Prices are \$1 a ton above silvery iron quotations of comparable analysis.

### **Silicon Metal**

OPA maximum base price per lb. of contained Si, lump size, f.o.b. shipping point with freight allowed to destination, for l.c.l. above 2000 lb., packed. Add .25c. for spot sales.

	Eastern	Central	Western
Zone	Zone	Zone	
95% Si, 2% Fe.	13.10c.	13.55c.	16.50c.
97% Si, 1% Fe.	13.45c.	13.90c.	16.80c.

### **Ferrosilicon Briquets**

OPA maximum base price per lb. of briquet, bulk, f.o.b. shipping point with freight allowed to destination. Approximately 40% Si. Add .25c. for spot sales.

	Eastern	Central	Western
Zone	Zone	Zone	
Carload, bulk.	3.35c.	3.50c.	3.65c.
2000 lb.-carload	3.8c.	4.2c.	4.25c.

### **Silicomanganese**

Contract basis lump size, per lb. of metal, f.o.b. shipping point with freight allowed. Add .25c. for spot sales. 65-70% Mn, 17-20% Si, 1.5% max. C.

Carload, bulk ..... 6.05c. 2000 lb. to carload ..... 6.70c. Under 2000 lb. ..... 6.90c. Briquets, contract, basis carlots, bulk, freight allowed, per lb. ..... 5.80c. 2000 lb. to carload ..... 6.30c. Less ton lots ..... 6.55c.

### **Ferrochrome**

(65-72% Cr, 2% max. Si) OPA maximum base contract prices per lb. of contained Cr, lump size in carload lots, f.o.b. shipping point, freight allowed to destination. Add .25c. per lb. contained Cr for spot sales.

	Eastern	Central	Western
Zone	Zone	Zone	
0.06% C	23.00c.	23.40c.	24.00c.
0.10% C	23.50c.	22.90c.	23.50c.
0.15% C	22.90c.	22.40c.	23.00c.
0.20% C	21.50c.	21.90c.	22.50c.
0.50% C	21.80c.	21.40c.	22.00c.
1.00% C	20.50c.	20.90c.	21.50c.
2.00% C	19.50c.	19.90c.	21.00c.
66-71% Cr, 4-10% C	13.00c.	13.40c.	14.00c.
62-66% Cr, 5-7% C	13.50c.	13.90c.	14.50c.

### **High-Nitrogen Ferrochrome**

Low-carbon type: 67-72% Cr, 0.75% N. Add 2c. per lb. to regular low-carbon ferrochrome price schedule. Add 2c. for each additional 0.25% N. High-carbon type: 66-71% Cr, 4-5% C, 0.75% N. Add 5c. per lb. to regular high-carbon ferrochrome price schedule.

### **Low-Carbon Ferromanganese**

Contract prices per lb. of manganese contained, lump size, f.o.b. shipping point, freight allowed to destination, Eastern Zone. Add 0.25c. for spot sales.

Carloads, Ton	Less Bulk	Lots	Ton
0.10% max. C, 1 or 2% max. Si	23.00c.	23.40c.	23.65c.
0.15% max. C, 1 or 2% max. Si	22.00c.	22.40c.	22.65c.
0.30% max. C, 1 or 2% max. Si	21.00c.	21.40c.	21.65c.
0.50% max. C, 1 or 2% max. Si	20.00c.	20.40c.	20.65c.
0.75% max. C, 1 or 2% max. Si	16.00c.	16.40c.	16.65c.

### **Ferrochrome Briquets**

Contract prices per lb. of briquet, f.o.b. shipping point, freight allowed to destination. Approx. 66 per cent contained chromium. Add 0.25c. for spot sales.

Eastern	Central	Western	
Zone	Zone	Zone	
Carload, bulk.	8.25c.	8.50c.	8.95c.
Ton lots	8.75c.	9.25c.	10.75c.
Less ton lots	9.00c.	9.50c.	11.00c.

### **Ferromanganese Briquets**

Contract prices per lb. of briquet, f.o.b. shipping point, freight allowed to destination. Approx. 66 per cent contained manganese. Add 0.25c. for spot sales.

Eastern	Central	Western	
Zone	Zone	Zone	
Carload, bulk	6.05c.	6.20c.	6.50c.
Carload, bulk	6.05c.	6.30c.	6.60c.
Ton lots	6.65c.	7.55c.	8.55c.
Less ton lots	6.80c.	7.80c.	8.80c.

### **Calcium—Manganese—Silicon**

Contract prices per lb. of alloy, lump size, f.o.b. shipping point, freight allowed to destination.

18-20% Ca, 14-18% Mn, 53-59% Si. Add 0.25c. for spot sales.

Eastern	Central	Western	
Zone	Zone	Zone	
Carloads	15.50c.	16.00c.	18.05c.
Ton lots	16.50c.	17.35c.	19.10c.
Less ton lots	17.00c.	17.85c.	19.60c.

### **Calcium Metal**

Eastern zone contract prices per lb. of metal, f.o.b. shipping point, freight allowed to destination. Add 5c. for spot sales. Add 0.9c. for Central Zone; 0.49c. for Western Zone.

Cast	Turnings	Distilled	
Ton lots	\$1.80	\$2.30	\$5.00
Less ton lots	2.20	2.80	5.75

### **Chromium—Copper**

Contract price per lb. of alloy, f.o.b. Niagara Falls, freight allowed east of the Mississippi River. 3-11% Cr, 88-98% Cu, 1.00% max. Fe, 0.50% max. Si. Add 2c. for spot sales. Shot or ingot

..... 45c.

### **Ferroboron**

Contract prices per lb. of alloy, f.o.b. shipping point, freight allowed to destination. Add 5c. for spot sales. 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C.

Eastern	Central	Western	
Zone	Zone	Zone	
Ton lots	\$1.20	\$1.2075	\$1.225
Less ton lots	1.30	1.3075	1.325

### **Manganese—Boron**

Contract prices per lb. of alloy, f.o.b. shipping point, freight charges allowed. Add 5c. for spot sales.

75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C.

Eastern	Central	Western	
Zone	Zone	Zone	
Ton lots	\$1.89	\$1.902	\$1.935
Less ton lots	2.01	2.023	2.055

### **Nickel—Boron**

Spot and contract prices per lb. of alloy, f.o.b. shipping point, freight allowed to destination.

15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni

Eastern	Central	Western	
Zone	Zone	Zone	
11,200 lb. or more	\$1.90	\$1.9125	\$1.9445
Ton lots	2.00	2.09125	2.0445
Less ton lots	2.10	2.1125	2.1445

### **Other Ferroalloys**

Ferro tungsten, Standard grade, lump or  $\frac{1}{4}$ X down, packed, f.o.b. plant at Niagara Falls, New York, Washington, Pa., York, Pa., per lb. contained tungsten, 10,000 lb. or more.... \$1.90

Ferrovanadium, 35-55%, contract basis, f.o.b. producer's plant, usual freight allowances, per lb. contained Vn.

Open hearth ..... \$2.70 Crucible ..... \$2.80 Primos ..... \$2.90

Cobalt, 97% min. keg packed, contract basis, f.o.b. producer's plant, usual freight allowances, per lb. of cobalt metal.... \$1.50

Vanadium pentoxide, 88-92%  $V_2O_5$  technical grade, contract basis, any quantity, per lb. contained  $V_2O_5$ . Spot sales add 5c. per lb. contained  $V_2O_5$ .... \$1.10

Silcaz No. 3, contract basis, f.o.b. producer's plant with usual freight allowances, per lb. of alloy (Pending OPA approval)

Carload lots ..... 2600 lb. to earload ..... 2600

Silva No. 3, contract basis, f.o.b. producer's plant with freight allowances, per lb. of alloy (Pending OPA approval)

Carload lots ..... 2000 lb. to carload ..... 55c.

Grainal, f.o.b. Bridgeville, Pa., freight allowed 50 lb. and over, max. based on rate to St. Louis

No. 1 ..... 50c. No. 6 ..... 60c. No. 79 ..... 45c.

Bortram, f.o.b. Niagara Falls

Ton lots, per lb. .... 45c. Less ton lots, per lb. .... 50c.

Ferrocolumbium, 58-60%, contract basis, f.o.b. plant with freight allowances, per lb. contained Cb. 2000 lb. lots

Under 2000 lb. lots ..... \$2.25 \$2.30

Ferrotitanium, 40%-45%, 0.10% max. f.o.b. Niagara Falls, N. Y., ton lots, per lb. contained Ti. .... \$1.22 \$1.26

Ferrotitanium, 20%-25%, 0.10% max. ton lots, per lb. contained titanium. .... \$1.35 \$1.40

High-carbon ferrotitanium, 15%-20%, 6%-8% carbon, contract basis, f.o.b. Niagara Falls, N. Y., freight allowed East of Mississippi River, North of Baltimore and St. Louis, per carload.... \$142.50

Ferrophosphorus, 18% electric or blast furnaces, f.o.b. Anniston, Ala., carlots, with \$3 unitage freight equalized with Rockdale, Tenn., per gross ton.... \$58.50

Ferrophosphorus, electrolytic 23-26% carlots, f.o.b. Monsanto (Siglo), Tenn., \$3 unitage freight equalized with Nashville, per gross ton.... \$75.00

Ferromolybdenum, 55-75%, f.o.b. Langlo, Washington, Pa., any quantity, per lb. contained Mo. Calcium molybdate, 40%-45%, f.o.b. Langlo and Washington, Pa., any quantity, per lb. contained Mo.

Molybdenum oxide briquettes, 48-52% Mo, f.o.b. Langlo, Pa., per lb. contained Mo.... \$80c.

Molybdenum oxide, in cans, f.o.b. Langlo and Washington, Pa., per lb. contained Mo.... \$80c.

Zirconium, 35-40%, contract basis, f.o.b. producer's plant with freight allowances, per lb. of alloy. Add 5c. for spot sales

Carload lots ..... 14c. Zirconium, 13-15%, contract basis, lump f.o.b. plant usual freight allowances, per lb. of alloy

Carload, bulk ..... 4.60

Alsifer (approx. 20% Al, 40% Si and 40% Fe), contract basis, f.o.b. Niagara Falls, carload, bulk ..... 5.75c. Ton lots ..... 7.25c.

Simanal (approx. 20% Si, 20% Mn, 20% Al), contract basis, f.o.b. Philo, Ohio, with freight not to exceed St. Louis rate allowed, per lb.

Car lots ..... 8.90c. Ton lots ..... 8.75c. Less ton lots ..... 9.25c.